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LAMBING

Lambing is the culmination of both the shepherd's and the ewe's cycle. The ewe has survived countless challenges in the form of disease-causing organisms, inclement weather, competition for feed, and just plain staying alive to carry out her function as the maker of offspring, the prime mover in the perpetuation of the species. Factors such as the length of daytime periods, seasonal changes, and daily changes have interacted in complex ways with internal mechanisms to guide the sequence of physiological changes that have brought her and her unborn lambs to this point. Her instincts and her memory of previous years have served her well, and she is prepared for pushing her youngsters out into the world.

Ideally, the shepherd has worked along with the ewe, providing feed in the right amounts and of the appropriate composition at the correct times. Diseases were staved off by preventive care, and sickness was treated properly. For the shepherd each year is a new period of learning and experiment — always seeking the elusive perfect plan for care and management. Every year is an exploration of the unknown, because nothing is ever exactly the same. The

skillful shepherd learns to read the signs in the flock and make appropriate changes. The shepherd has spent a lot of time watching the sheep and learning from them.

Lambing is a time when sheep and shepherd are most closely associated. Even with range flocks in the West, ewes are commonly brought to sheds or fenced lots for lambing so the herders and owners can be with the band to provide at least minimal help as needed. With the farm flock some overdevoted shepherds may literally move into the barn with the sheep to be sure to be there in time of need. Some small holders do the reverse and bring ewes into the house. Many producers let the ewes lamb in a clean pasture, just checking once a day, especially if they have culled ewes who have lambing problems in an attempt to build a low-labor-input flock. No matter what the environment, ewes and people form a close bond at lambing time that is unparalleled in the relations between man and other animals. It is a relationship that is not far different from that between husband and wife at the birth of a baby. It is an event that measures the sheep raiser against an unwritten standard and rewards those who give of themselves.

Yet some sheep raisers almost totally ignore lambing. They don't want ewes who give twins because they are too much trouble. They want all lambs born by magic, preferably in the daytime on a warm day, and they will tell you that a ewe who doesn't do everything according to their preconceived notion is stupid. These are the same people who think that a sick sheep is a dead sheep, that lambs have no will to live, that worming is a waste of time and money, that sheep can certainly winter over on a diet of corn stubble, and that their grandfather sure didn't have to do all this fancy stuff to raise sheep. One can only hope that the economic losses they will incur are sufficient punishment for these ignoramuses.

EARLY SIGNS

During the last part of gestation the pregnant ewe may have bagged up. Apart from her great size, this is the first indication of events to come. The enlargement of the udder is one of many changes, some visible, some not, that are triggered by hormonal signals from the unborn lamb. The ewe responds to the chemical signals from the lamb with chemical signals of her own, a sequence that can be monitored by measurement of hormone levels in the

blood if fancy analytical equipment is available. The ewe requires no fancy laboratory facilities to tell her that events are getting ready to take place. To male shepherds all of this must be taken on faith, but I have been assured by women that early labor can be sensed by the female long before anything overt happens.

The ewe may stand apart from the flock, looking rather distant and distracted, and lose her appetite. Ewes that are getting ready to lamb for the first time will act puzzled and even distressed by the strange and unfamiliar signals they are getting from their bodies. Older ewes remember the signals, and may begin to act motherly days before their due date, often trying valiantly to steal lambs from ewes who have already lambed. The ones that are due may have a swollen, pink vulva and may lose a mucous plug and show a slight, clear, viscous discharge from the vulva.

Still further on toward the great event, the ewe's uterus will sag to a lower position. This event is easily visible because of a change in the ewe's body shape. The plumpness at hip level shifts to a lower level, leaving a hollow on each side below the spine and just forward of the pelvis. The ewe is said to have sunk. This sinking is relative to how she looked earlier, of course. Some older ewes look pretty sunken and saggy year-round. If sinking is evident, lambing will probably occur within hours rather than days.

About the same time that the sinking comes on, the ewe may seek a place isolated from the flock and dig with her front feet to make a nest. Once again, the experienced ewes and first-time mothers may react differently. Most old timers will seek shelter in the barn or shed and dig their nests in available bedding. The new mothers are more likely to dig outdoors, well away from the flock, and may not even dig at all. If a ewe starts digging, or a yearling goes off by herself, the shepherd can expect lambing in the hours that follow.

GETTING CLOSE

Some ewes will show all the early signs of lambing; some will show none at all. Don't worry if you spot none of the "official" early signs of lambing, especially if you are new to sheep raising. A sign that is obvious to an experienced shepherd may be altogether invisible to the eye of a novice. Keep looking; you'll learn.

When lambing is really getting under way, most ewes will lie down in their

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crude nests and show signs of strong contractions. After a push or two they will commonly get up, move around a bit or turn in place, and then lie down and try again. Sometimes they will choose a new spot if things don't go the way they want them to in the first one. When they are really in hard labor they will pull their upper lip back as they push hard, sometimes making grunting noises along with the pushing and straining.

As contractions and pushing continue, many ewes begin to make licking motions in instinctive response to their hormonal messages. Older mothers may try to claim other lambs at this point, but then they usually get back to business without need for encouragement.

Novice mothers and even some older ewes may bypass all these symptoms and just stand around until they start to lamb. Whether or not signs of lambing have preceded it, at some point the lamb and the enclosing water bag (the amnion) will leave the uterus. In a normal birth, the muscles of the cervix, the opening connecting the uterus and the vagina, will relax and the cervix will dilate to accommodate the passage of the lamb and the amnion with its contained fluid. At the same time, the pelvic bones should have separated and the pelvic opening enlarged to permit passage of the lamb and water bag without undue difficulty. The water bag sometimes breaks before the lamb has emerged, or it can protrude ahead of the lamb. When the amnion breaks, fluid pours out; the ewe has "lost her water," in common parlance.

The usual and normal presentation of the lamb is front feet first, followed by the nose resting between the tiny hooves. If this is the case, many shepherds will break the water bag to release the fluid because normal presentation generally means a birth with minimum problems, and one does not ever want the lamb to inhale amniotic fluids. If the birth were to be abrupt, as sometimes happens, the umbilical cord can rupture, signaling the lamb to take a breath, and it can inhale a usually fatal sample of the amniotic fluid.

BIRTH

In the hoped-for normal case, the ewe will push during contractions, and the lamb's hooves will show, followed by the nose, and then the rest of the body. This can take a few seconds or hours. As long as the amnion is not broken, there is no hurry. The lamb is receiving oxygen and nutrients through the umbilical cord, and it is safely cushioned by the amniotic fluid. The shepherd



Birth of a lamb: the water bag has broken (the remains are dangling), and the tips of two front hooves are visible.

should resist the urge to help when help is not really needed. As long as the ewe is not tired, and she pushes along with her contractions, give her the chance to complete the job all by herself. If the birth is too easy, either by itself or because of premature assistance by a well-meaning shepherd, the ewe may not receive enough feedback signals from helping; she may not realize that she has lambed at all, and she may reject the lamb as not being her own.

If a ewe is slow to start lambing, and the water bag breaks, or she begins to tire and reasonable progress is not being made, some assistance is in order.

There are two common causes for slowness of a normal-presentation birth. Probably the commonest is the vulva not stretching enough to clear the eyebrows of a large lamb. The shepherd can usually ameliorate this condition by running a finger firmly over the back of the eyebrows from outside of the taut vulva. Do this a few times, rather like working a tight, heavy sock over a heel; the head will generally pop out, and the rest is easy. If that fails, use your forefinger to spread some lubricant over the lamb's head and around the inside of the vulva, and try again. At the same time, pull the legs downward toward the



This birth is a normal presentation, with both hooves and the tip of the nose protruding from the tightly stretched vulva. At this point, if the water bag had not already broken, the shepherd would break it and clear the lamb's nose.

ewe's heels, wiggling them a bit as you pull. If the head is the problem, your job is to free it, so don't get overly enthusiastic about the legs.

The other common problem with a normal presentation is that the lamb's shoulders are too big to slip through the pelvis or vulva. The technique here is to pull on one leg only so as to tilt the lamb's shoulders and get one through ahead of the other. Take a firm grip on one leg, and pull it downward while you move it back and forth to help work the leading shoulder ahead of the trailing one. The shoulders will finally release with a mighty heave, and the rest of the delivery should be easy.

Once the lamb is out, the ewe may get up immediately and turn to lick it to clean it up, making characteristic gargling baas to the lamb. Let the umbilical cord break on its own. Once it is broken it should be promptly dipped in iodine. If a piece of the cord longer than a few inches is attached to the lamb, pinch the cord near the lamb's body, and pull at it with a stripping motion with the other hand to break it off closer to the abdomen, and then dip the



After some pushing by the ewe, the head pops free.



Following more contractions, the ewe has pushed out the shoulders of the lamb.



The lamb is born, still partly wrapped in the remains of the water bag, as the ewe begins to clean up the newborn. This lamb was the first of twins.

cord in the iodine. A convenient way to ensure a thorough iodine treatment is to keep the iodine in a small, wide-mouthed jar. Catch the free end of the cord in the jar and then place the mouth of the jar against the lamb's abdomen, and tip it so that the whole cord and the area around it are bathed in the iodine, the jar being pressed snugly against the abdomen to prevent spilling. With a vigorous lamb in warm weather, that is all that is required of the shepherd.

Needless to say, not all lambs have read this book, so they naturally don't do everything just as I've said they will. One thing some of them don't do is breathe. Now and then one will come out and just lie inert on the floor. You may be able to see or feel a heartbeat, but there is no breathing. There are various methods recommended by different sources to induce breathing. These include bizarre techniques such as plunging the lamb into ice-cold water to make it inhale at the shock, or dribbling some whiskey down its throat to make it cough and start to breathe. It seems to me that anyone who recom-



First meal: since that teat is a long reach, the newborn Lincoln ram must stretch for its first colostrum milk.



With a little nourishment, the lamb is up on all fours, tail flying, for a serious meal.



Two handsome ram lambs out of a champion Lincoln ewe—what more can a shepherd ask?

mends this should stay in the house with the whiskey and ice water, and send someone else to the barn for lambing.

In most cases all one has to do to induce breathing is shake the lamb a little or lift it an inch or two off the bedding and drop it. Almost any movement, including the ewe's licking and nudging, seems to help. If shaking or dropping don't work, grab a piece of straw from the bedding and use it to tickle the inside of the lamb's nose. All of these actions should take you only a few seconds.

If the lamb still won't breathe, you should promptly swing the lamb through the air, as recommended by the English veterinarian Eddy Straiton in his book *The TV Vet Sheep Book* (Ipswich, England: Farming Press Ltd., 1972), where he is pictured with a lamb flying over his head, gripped by a single, muscular hand. We prefer two hands for those slippery little ones, but the technique is otherwise the same. Grasp the lamb by the rear legs, up by the hocks, and swing it in a full circle, up over your head, and back down again a couple of times. If it doesn't breathe, repeat the procedure. The only

time we have ever had to do anything else was with a head-first lamb that had a very swollen tongue blocking the trachea. I cupped my hand over its mouth and nose, and blew gently into my hand to inflate the lungs, then Teresa swung the lamb. It started breathing—as all lambs will as far as I know, if there is any spark of life in them at all.

Be careful not to hit the hapless lamb's head against the barn or the ground. If you are indoors with a low ceiling, the lamb can be swung in a circle with a high side and a low side to do almost the same job. The reason that this method works so well is that the weight of the gut falls away from the diaphragm at the top of the swing, causing an inhaling. The gut then presses against the diaphragm at the bottom of the swing—both from the force of gravity and from the centrifugal force of the rotation; this pushes air out of the lungs. The swinging also helps clear the lamb's mouth and nostrils of fluids. You should not hesitate to swing the lamb right away if the dropping and shaking fail to work, because the lamb is deprived of oxygen and could suffer brain damage quite quickly. Even a lamb with a full deck of cards is no genius, so don't make things worse.

An effective alternative to swinging the lamb is to use a chemical called Dopram V (Doxapram Hydrochloride), which stimulates breathing. All one needs to do is place a few drops, up to $\frac{1}{4}$ cc, under the back of the tongue. It can be injected with a short needle, but it will be absorbed by the tongue even if not injected. Be sure the airway is unobstructed, because Dopram V really works, and fast, too. This is a drug that must be obtained from your veterinarian. Some vets are reluctant to give Dopram to clients, but used carefully it is safe and very effective. I always carry a small bottle of it and a small syringe in my coat pocket during lambing. Be careful not to get it on your skin, because it will affect your breathing too.

Not all lambs arrive in the so-called normal birth position with both front hooves forward and the head nestled in between, so be prepared to deal with other possibilities. Some of the various birth positions present few difficulties, but others are a bit tougher to deal with. I'll describe the various possibilities and suggest solutions.

One Leg Back

If only one leg and the nose are showing, don't try to get the other leg turned forward and out. Roll the ewe on her side so that she lies on the same side as the turned-back leg. Thus the ewe should lie on her right side if it is the



Swinging a slow-to-go newborn lamb like this will start it breathing almost every time.

lamb's right leg that is turned back. In other words, roll the ewe on her side so that the turned-back leg is up. Grasp the leg that is out and pull as you work the vulva over the lamb's head. At this point, the lamb will usually either pull free or the trailing shoulder will hang up on the ewe's pelvis. In such a case you want to pull on the free leg and twist the lamb at the same time. To

do this, pull on the leg as you move it toward the ewe's spine. At the same time, pull on the head as you move it toward the ewe's hocks. These motions will rotate the lamb and sort of unscrew it from the pelvis. This may take quite a few tries and quite a bit of force, but keep trying. The shoulder will finally pop free, sometimes very abruptly, landing you on your rear end, and the rest of the delivery should be easy. With this and other assisted deliveries, you can give the ewe a chance to finish the job once you have solved the problem, but don't give her too long because the lamb has already been through a lot, and should be gotten out promptly either by the ewe or the shepherd.

Head Only

If only a head is showing, the ewe is unlikely to be able to deliver on her own. You should feel with a finger to find out if the lamb's legs are both doubled back or if one or both of them is next to the side of the head. If a hoof is next to the head, try to pinch it with your fingers and pull it out. Those little hooves are mighty slippery and hard to hold onto, so you might try a loop of twine or umbilical tape to snare it. Do the same with the other hoof if it is there. If both hooves can be brought out, the birth should proceed normally. If the lamb's tongue is swollen and bluish in color, go ahead and pull the lamb promptly. If you can only catch one hoof, proceed as with one leg back.

If the head is showing and both legs are trailing back, you will have to get one leg out. Push the head back through the pelvis, making sure that it doesn't turn back. Feel at the shoulder to find a leg. Start at the shoulder, using one or two fingers, and straighten the leg and bring the foot through the pelvis. Now bring the head back through, and bring both head and the one leg out, and proceed as with one leg back.

If the head has been out or in the birth canal and is badly swollen, you may not be able to push it back inside. In this event, use lots of lubricant and try to work a hand or even a finger in behind the head. Try to grasp behind the head or on a shoulder. Get hold of anything you can. Patience is the key here, and strong fingers don't hurt a bit either. Pull and tease and twist and rock the lamb back and forth. Usually the lamb can be saved with enough slow and persistent work. All too many people give up and cut off the lamb's head or take some other drastic solution without making a fair try to work the lamb out.

Extra-Large Lamb

Even a normal presentation can be difficult if the lamb is very large. It helps in these cases to have an assistant hold the ewe upside down on her spine.

This is easier said than done. The best way is to tie a twine between the back hooves of the ewe and loop it over the assistant's neck and shoulders. The assistant should be straddling the ewe, facing her posterior. One leg can be held in each hand and part of the weight carried by the twine. With the assistant holding the ewe in this position, the shepherd will have an easier time twisting and pulling the lamb out. With big lambs, try to get one leg past the pelvis ahead of the other because the shoulders may be too big to go through together.

Front Feet Only

If the front feet are out but not the head, this means the head is turned back against one side of the lamb. You will have to put the feet back inside the ewe in order to get the lamb back far enough to be able to turn the head forward. In order to keep track of the hooves, tie a piece of twine or umbilical tape to each one before pushing them back in. Then push the lamb back into the uterus, and try to bring the head around to lie between the legs. Once the head is brought around, draw it out while bringing the legs out with the help of the twine or tapes. Once the head and legs are out you are back to a normal delivery position.

If the head cannot be guided out with the hand, a loop of three-inch-wide gauze bandage, twine, umbilical tape, or insulated electric wire can be used. Twist the gauze or whatever to form a loop that fits over the lamb's head, and tie a knot if you wish. Slip the loop over the lamb's head with the loop behind the head. Let the long end of the gauze come out from under the chin. The loop and gauze are like a collar and leash on a stubborn dog that is backing away from you. Then, pull on the "leash" and on the twine attached to the hooves. This should draw the lamb out. If you use a wire noose, be very sure that the sharp end of the wire is covered so as not to cut the uterus. Also be sure that a fold of the uterus is not pinched in the loop. There are lamb pullers on the market for this purpose, but the gauze bandage or even twine is really more satisfactory in my opinion. This whole procedure is aided if the ewe is held upside down on her spine as described for the extra-large lamb.

Hind Legs First

The hind-legs-first presentation is really almost normal. If you are not sure how to tell a hind leg from a front leg, take a look at a lamb and study its legs. This will tell you more than I could even if I wrote about it for pages. Once you know you are looking at hind legs, just assist by pulling, being careful not

to crush the lamb's ribs in the process because you are pulling against them. Pull gently while rocking the lamb from side to side to free the ribs from the pelvis. Once the ribs are freed, it is wise to get the lamb out quickly and clear its nostrils so that it does not breathe in any amniotic fluid or mucous.

Tail Only

If all you see is a tail, push the lamb back in and bring out one rear leg at a time by hooking your fingers around the hocks. When both legs are out, proceed as with hind legs first. The headback lamb can be handled in this way too by turning it around and delivering it backside first.

Crosswise Lamb

If the ewe strains and pushes to no avail, slip your lubricated hand and arm in and investigate the situation. If a lamb is crosswise, turn whichever end is closer toward you and proceed as with the above cases.

Closed Cervix

Another possibility when the ewe works hard but makes no progress is that the cervix is not dilated. It can help to gently manipulate and massage the cervical area with a finger, which sometimes will cause the cervix to relax and dilate. Sometimes the cervix will not dilate (ring womb). In such cases an injection of 100 ml calcium borogluconate subcutaneous in several sites may help. In other cases the pelvis has not spread enough, and the pulling procedure will take care of that. With valuable animals a Cesarean section is the last resort.

Twins Tangled

It is hard to give any rules for tangled twins except patience. The shepherd has to feel carefully and follow the legs with his fingers to find out which legs belong to which lamb. Once a lamb is identified, it can be moved to one of the birth positions. It is a matter of pushing protruding legs back and untangling the lambs with care. A special effort must be made not to get the umbilical cords caught. Fortunately for all of us, tangled twins and triplets are more often found in books than they are in the lambing barn. Lots of exercise during gestation is the best insurance against tangles.

Failed Efforts

If any of the above techniques fails completely, the shepherd will have to decide whether to call a veterinarian. If the ewe or lambs are sufficiently valuable, a Cesarean section may be the answer. Pulling harder and harder will

probably kill the ewe as well as the lambs. If you opt for the C-section, it may be a good idea to call ahead and take the ewe to the vet's office. The vet will be ready and waiting, and will have better facilities than your barn. Also, you save yourself the cost of an on-farm call.

NEWBORN LAMBS

Once a lamb is out of the ewe, is breathing, and has been treated with iodine, then what? In some cases, nothing else need be done right away, but it is usually worthwhile to take care of a few minor items. In cold weather, the ewe can use a little help in drying off the lamb. Rub it with a towel, an old sack, a handful of straw, or anything handy. If the weather is really cold, say below zero, more serious measures are in order. The ears of lambs are susceptible to freezing in zero and below-zero weather. You must get them dry, and the best way to do that is to use a hand-held hair dryer. If the ewe is doing a good job of licking there may be no reason to use the hair dryer on any part of the lamb except the ears, but do get them dry. Be careful with the hair dryer, because you can burn the lamb if you are overly enthusiastic.

If a lamb is chilled, as may be the case for one born unattended, it will have to be warmed up. It can be placed under a heat lamp or warmed with the hair dryer. For really chilled lambs, the best thing is to immerse them in warm water. Be aware that a chilled lamb may be too cold to shiver. A shivering lamb is doing so to get warm and may be doing just fine, though it might need a little drying if it is wet. To warm a chilled lamb, get a pan of water that is warm to your hands but not hot and immerse the lamb, keeping its nose above water. Let it stay there a while, soaking up heat, then remove it and get it thoroughly dry with a towel and hair dryer. There is always a chance that you will rinse off enough of the lamb's scent so that its mother will reject it, so don't scrub it, just let it soak, and let her smell it before you scrub it with a towel. If possible, you can do the immersion right in front of the ewe so she sees and smells the whole thing.

Some shepherds take a lamb into a warm room or into the house to warm up, but the water method is much quicker. Some lambs are warmed in an oven, or so I'm told. For heaven's sake, don't ever put a lamb in a microwave oven. Whatever method you choose, be sure that the lamb is warmed clear through and not just on the outside. The reason for this is that in a cold lamb

the internal blood vessels are fully expanded. If the external blood vessels are opened by warming, a drop in blood pressure will occur, with resulting shock. Warm slowly and fully.

Some producers build warming boxes to use with chilled lambs in the barn. There are many designs, but basically they are boxes with warm air circulating through them. The warmth can be from light bulbs or from a hair dryer attached. Design them so the lamb cannot contact the hot light bulbs, or so the warm air from a hair dryer does not blow directly on the lamb. The temperature should be 100–120° F. If you are handy with electrical things, use a thermostat to control the temperature.

The usual reason for a cold lamb is a lack of food. A lamb that gets one good meal from the ewe will rarely get chilled. That early meal of nourishing colostrum seems to really fire up the internal furnace. Check the lamb by sticking a finger into its mouth. If it feels cold to you, the lamb is chilled. It needs food and warmth. If you have already warmed it, get some food into it. It is hard to say which to do first, because both are important.

The first food should be colostrum, that first, very thick milk that comes from the ewe. I'll even go so far as to say that the first meal *must* be colostrum. Colostrum has three main effects. First, it provides quick nourishment in just the form the newborn lamb needs. Second, it is mildly laxative, and it helps the lamb to get rid of the first tarry, sticky feces (the meconium) that it is born with. Quick energy and a laxative are both good things for a lamb, and the energy will warm the lamb quickly.

The essential thing about colostrum is that it contains antibodies from the ewe to help the lamb fight off disease until it starts making its own antibodies. Without the protection from colostrum, the newborn lamb is completely unprotected. In human beings, some antibodies are transferred through the placenta to the unborn baby, but with lambs this is not the case and they must have colostrum. Colostrum that contains a large amount of immunoglobulin-G's will often be very thick and have a high weight per volume. However, yellow color and a thick consistency are not indicators of quality. If you really want to be quantitative, buy a colostrometer from a veterinary supply house. High-quality colostrum will contain 50 mg or more of the IgGs per ml. You should reserve and freeze a quantity of the high-quality stuff to use when a ewe doesn't produce the premium grade product. There are products marketed as colostrum replacements, but they are not nearly as good as the real thing. They can be used as supplements, but not as a replacement.

Colostrum antibodies are large protein molecules that can be absorbed through the walls of the intestine of very young lambs. The ability of the intestine to absorb large molecular weight proteins is limited. If ordinary proteins are in the intestine, they will be absorbed, and the capacity of the intestine to absorb antibody proteins will be used up by the ordinary proteins. Thus, an early meal of ordinary milk or some prepared mixture will in effect take up the space that could have been used for antibody absorption. For that reason never give a lamb a feeding of milk or other fluid until it has had a meal of colostrum either from its mother or from the shepherd, unless of course there is no possibility of its getting colostrum for some reason—such as the death of the mother, the lack of milk letdown, or some other cause. You should have saved some real colostrum for bottle feeding to cope with this possibility. A lamb should ideally get colostrum within thirty minutes, and in no case later than six hours from birth. Within the first twelve hours of life, and lamb should get about 10 percent of its body weight in colostrum.

Colostrum supplements will not contain antibodies that are specific to the disease organisms on your farm. I did talk a dairy farming neighbor into letting me give one of his pregnant cows an injection of the bacterin for immunizing against *Cl. perfringens* types C and D. Then he saved most of the cow's colostrum for me to put in the freezer to use with lambs. It was very effective, although not as nourishing as sheep colostrum.

When thawing frozen colostrum or mixing colostrum substitutes with water, keep the temperature below about 125° F, or better yet just room temperature, to avoid destroying some of the IgGs.

As part of the normal routine to get the lamb started feeding, first clear the ewe's teats by stripping them with thumb and forefinger to expel the waxy plug and get the first milk flowing. Then you can let the lamb try to find the teat on its own, and a vigorous one will do so. Give it a reasonable time to do the job itself. It is generally of no use to try to put the lamb to a teat if it is not already trying to get up by itself, anyhow. Once it starts trying to get to its feet, it will be ready to suck. It can be guided to the teat with your hands by nudging it gently from the side or rear the way a ewe would do. The head can be held under the chin and put to the teat. With some lambs, just aiming them in the right direction is all they need. Don't try to grab the head and force it to the teat. The lamb will fight you and tire itself. If the lamb doesn't suck readily, avoid frustration by using a bottle. Milk about two ounces of the ewe's colostrum into a clean bottle, screw on a lamb nipple, and feed the

lamb. If it doesn't want to suck on the bottle either, try covering the top of its head and eyes with the palm of your free hand; this simulates the feel of the ewe's bag and thigh. You can also try tickling the lamb under the tail to get the sucking instinct stimulated. Touching the roof of the mouth with the nipple is sometimes helpful too.

If these methods fail, and they sometimes will, you should get a meal into the stomach by tube. A lamb that will not suck on its own is probably too cold or weak or both. There are a number of ways to get a few ounces of colostrum into the stomach. I prefer an attachment for a glass-metal syringe called a Lambprobe that is made by the McGrath Company, P.O. Box 148, McCook, Nebraska 69001. The Lambprobe is a stainless steel tube with a little bulb on the end that can be guided down the throat of the lamb into its stomach. The lamb is placed on your lap, lying on its side, and the probe is inserted with the right hand as the left hand is held to the underside of the head and neck so the bulb can be felt going down. After a try or two you will find that the Lambprobe is quite easy to use. Ours attaches to a 35 cc syringe, which allows one to give a little over an ounce of colostrum per insertion. A pistol-grip syringe would be even handier. There is a similar device called a safety-ball nozzle pipe available from Wooltique (see appendix 6 for address) that attaches to a drench syringe; however, the ball may be a bit large for very small lambs.

You can make a stomach feeder from a 60 cc plastic syringe by attaching either a length of quarter-inch (inside diameter) clear plastic tubing or an ordinary rubber catheter that can be obtained from a hospital or nursing home. If you use the plastic be sure to smooth the cut edge so that the lamb's throat is not abraded or cut. Smooth it with sandpaper or by heating with a flame briefly. Both of these tubes, particularly the catheter, are flexible, so they cannot just be shoved down the throat as with the metal tubes. Let the lamb swallow the tube as you advance it.

There are other arrangements for stomach feeding that I do not consider quite as handy. You can attach a funnel to one end of plastic tubing. Or, you can use an enema kit purchased at a hospital, drugstore, or nursing home. It has a plastic bag with a long tube attached and a clamp on the tube to serve as a valve. The bag can be hung on a nail, which frees both hands to insert the tube. There are also rubber bulbs with tubes attached, sold by suppliers.

When you stomach feed a lamb, be sure not to give it too much colostrum. Most authorities recommend feeding a lamb less than a week old only one to



Feeding a lamb with a Lambprobe is simplicity itself. Fingers under the throat, holding the neck straight, can feel the probe go down.

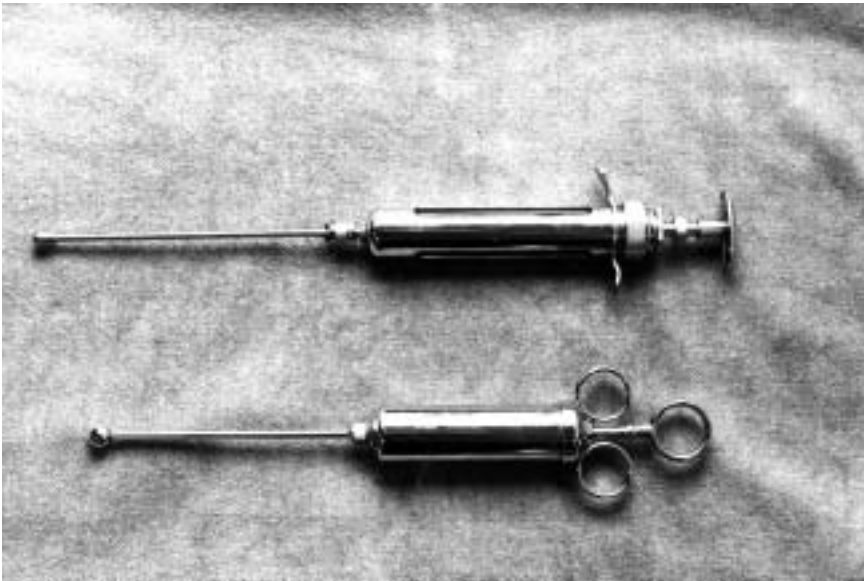
two ounces of colostrum every two hours for the first four feedings, then changing over to two to four ounces six times a day. Err on the side of less rather than more, because overfeeding will give a lamb diarrhea (scours) from which it may not recover. Remember—no matter how many gadgets you have for stomach feeding—that you are just trying to get the lamb started so it will suck on its own mother or on a self-feeder. When a lamb sucks, the milk passes around the rumen to the true stomach where it belongs.

A really weak lamb can be given nutrition in the form of a solution of glucose that is injected. There are two concentrations of the solution on the market (5 percent and 50 percent). There also are dextrose solutions. It doesn't matter which sugar is used. Most people prefer to use the 5 percent solution because it does not invite dehydration. A total of about 2 to 3 cc per pound can be given subcutaneously at several sites (no one site should receive more than 10 cc). There are also solutions that contain amino acids and electrolytes, but the plain sugars do the job. Repeat every four to six hours if needed.

You can also inject the whole amount into the body cavity. Veterinarian David Henderson (see his book in appendix 6) suggests mixing 40–50



A plastic syringe with either a length of plastic tubing attached (as shown) or with a rubber catheter (below) can be used to put a meal in a lamb's stomach.



Two types of stomach feeding devices: top, a Lambprobe-equipped glass and metal syringe; bottom, a safety-ball nozzle pipe on a drench syringe.

percent glucose or dextrose solution with an equal amount of freshly boiled water. You want to give about 5 ml of the solution for each pound of weight of the lamb. So, maybe 50 ml for a big single to 30 ml for a small triplet. Use a large syringe—like 50 ml or so—and, using a needle, draw half the amount you need from the concentrated sugar solution. Remove the syringe from the needle and draw in an equal amount of the hot water. Place a one-inch needle on the syringe and draw in enough air that you can mix the solution a bit. Then, needle up, force out the excess air. Standing, hold the lamb by its front legs, hanging down against and between your thighs. Insert the needle downwards at about a 45-degree angle and an inch below the navel and a half inch to either side of the navel, and inject the contents slowly. The needle should slip in with no resistance. If you feel that you are hitting something, withdraw and try again. You don't want to inject into the bowel or intestine.

While you are shepherding one lamb, the ewe may be getting ready to have another one. If she has been jumpy and nervous and has not let the first lamb nurse, it may be that she feels the signs of another one coming. Be patient in getting the first lamb to the teat if another is on the way. A ewe who is going to have another lamb usually holds her tail straight out or even somewhat elevated. Also, if a water bag containing a yellow fluid protrudes from her vulva after the birth of one lamb, probably another will arrive.

A water bag filled with red, bloody fluid usually, though not always, means that lambing is over. The sure sign that lambing is over is the appearance on the water bag (either filled with fluid or empty) hanging from the ewe's vulva of a white, wormlike piece of tissue, either attached to it or corkscrewed around it.

Once a ewe has had her last lamb she will generally get down to the business of being a mother and will lick the lambs clean and help them to her bag with nudges from her nose. Some ewes may show a preference for one lamb over another. This usually passes with time, but be alert for a ewe that rejects one of a pair, because the ignored one can starve if not allowed to suckle. Some ewes will not accept their lambs at all, especially first-time lambers. In such cases, the ewe has to be confined in some way to allow the lambs to nurse her. I'll discuss methods for this under Handling.

With most ewes and their lambs, all that is needed is to pen them up in a jug (pen) where they can get fully acquainted. Don't let them run with the flock if you can help it, because the lambs and ewe can get separated. Also,



The white, wormlike structure (next to the finger) on this water bag filled with red-tinged fluid tells the shepherd this ewe is not going to have any more lambs, at least not this year.

other ewes may injure the newborns, who will try to nurse on any teat that is handy until they learn to recognize their mother, and most ewes get pretty irate when a strange lamb tries to suck on them. So, pick up the lambs by their front hooves and drag them slowly across the bedding to the pen. Dragging leaves a trail of scent for the ewe to follow. If she returns to the birthing place, as many of them will, try again until you can close her in the pen. Stand back and admire the newborns with their mother for a moment and then get back to work. If you have used a heat lamp, consider removing it. The extra heat seems to encourage pneumonia if used too much, and the lamps can start fires.

NUTRITION

The ewe needs to have her food intake adjusted for a few days to help her make the transition from lamb maker to milk factory. The ewe's milk-secreting or-

gans have already been stimulated by the hormones from the unborn lamb, and they are ready to go into production. But full production is not really what the shepherd wants right at first because the demands of the lambs may not quite be up to the ability of the ewe to make milk, and an overinflated udder is an invitation to bag problems or reduction in milk output.

In order to keep the milk supply at a lowered level for a few days, no grain should be fed. The ewe will relish a big tab of good hay right after lambing, and she can be given about four pounds of hay a day without creating any problems. Once the lambs are nursing strongly, she can be put onto a full lactation ration by increasing the grain in steps. You can judge when to bring grain back into the ration by feeling the ewe's bag. If she is being milked out, her bag will be soft and pliable even though it may be large. Be sure to check both sides of the bag, because sometimes a lamb or lambs will nurse only on one side or more on one side than the other. When this happens the shepherd can try to introduce the lamb to the other side, but it is hard to change their habits once they are established. If a ewe is too full, milk her out and save that colostrum for future use.

Some shepherds give their ewes a bucket of warm water with some molasses in it for the first after-lambing drink. There is nothing wrong with this, and most ewes have enough of a sweet tooth to enjoy it, but it probably isn't really necessary. An exhausted ewe might benefit from the energy and warmth, though. Most ewes are perfectly happy with plain cold water, however.

In the foregoing discussion, I have assumed that the ewe has a full bag that the shepherd is trying to keep under control. Some ewes will be slow to come into their milk, however, and may need a little encouragement. For these you can keep feed at late-gestation levels but improve the quality of the hay they get. You should encourage slow milkers to drink water by giving them salt, and even give them warm water if that is practical for you to do. Don't forget to check the lambs of ewes who are not yet milking to capacity. A hungry lamb will usually complain loudly, but the shepherd should pick it up anyway. A hungry lamb feels light, thin, and hollow, and it may be cold as well. It will not have the round, full belly of the well-fed ones. Be sure to check the lambs, because they can die of starvation even in the pen with their mother.

The ewes who started off with little milk may come into full capacity suddenly, and this needs to be controlled. Check bags daily, or oftener, and make adjustments in feed as needed. There is no substitute for experience, so get in

the pens and feel the bags frequently. You'll learn fast. If you run into a problem you don't know how to solve, ask a dairy farmer or someone who milks goats. They'll be able to give you sound advice.

With large operations in which hand palpation of bags is not possible, Aureomycin can be fed at recommended rates in the ewe's grain ration to reduce incidence of mastitis. Mastitis rarely shows up in the first day or two after lambing, except in ewes who had it in previous years. It is worthwhile to check, anyhow. Milk a squirt of milk into a shallow, dark-colored container or even into the palm of your hand. If it is stringy, lumpy, watery, or bloody, the ewe may have mastitis and should be treated as discussed in Lactation.

ENVIRONMENT

If the ewes lamb in an insulated barn or in an open shed, there is a need for small pens for the ewe and her newborns. These pens are called gaols (jails) by the British and jugs by Americans. The size of lambing jugs has undergone negative inflation in the past couple of decades. Authorities used to recommend jugs as large as six by eight feet. The trend today is to a jug of four by four feet, or even three by four. We use four-by-four jugs and find them to be plenty roomy, and some of our ewes are quite large. Small jugs are a benefit, because one can cram more of them into a given space if barn area is limited.

There are many designs for jug panels. Most lambing barns have a mixture of types that reflect the changing ideas of the shepherd. Also, a lot of equipment such as panels is bought and traded at auction sales and the like, so some panels are home built while others were bought secondhand. Apart from details of construction, the main choice in design is between solid panels and ones that the ewes can see through. I personally favor solid panels—all else being equal—because the ewes cannot see through them. Some ewes are highly protective of their offspring and will try to fend off neighboring ewes by butting through the panels. If they can't see the other sheep, they won't butt. I'm not the least bit concerned about them hurting their hard skulls, but they can reduce a panel to rubble in short order, and then I have to repair it.

Our panel collection is as motley as any, including specimens as bizarre as board panels made from wood stripped from vintage railroad boxcars, but my favorites are made of a solid sheet of plywood. A standard 4-by-8-foot sheet of plywood can be sawed into three panels that are 48 by 32 inches with zero

waste. Because of the high humidity of most barn floors, I use plywood with exterior glue. You may be tempted to use half-inch plywood, but five-eighths is a lot sturdier and is a better long-term investment.

Panels can be linked together with hinges or elaborate locking pins, which is perfectly fine if your budget includes money for the hardware. My attempts at fancy designs with metal hooks and keyways were all flops in actual practice, and we assemble all of our jugs with old baler twine, a product that is always in surplus supply in a lambing barn.

I drill large holes in the sides of the plywood panels, two on each short side, and tie the twines through the holes. With the cheaper grades of plywood, some of the holes will break out, a problem that can be solved by getting a better quality of plywood, or by nailing a one-by-four of lumber down the short sides as strengthening.

A double row of jugs can be made in an open area by using a steel-mesh hog panel as a divider and tying four jugs on each side to give a free-standing group of eight. Active ewes may deform the jugs from squares to parallelograms with this arrangement, a minor nuisance that can be corrected by moving them back to a square each day or by putting a diagonal brace across one of the jugs in each row. The ewes can see one another through the hog panel, of course, but the steel will resist their onslaughts until they tire of the game.

Feeding in the jugs is managed with simple wooden feeders that hang on the sides. Some greedy ewes will eat their neighbor's hay as well as their own with such an arrangement if they can reach it, and there is something to be said for feeding a tab of hay on the floor in a corner to stop the stealing by larcenous associates. One advantage of the solid plywood panels is the absence of crosspieces that the ewes might stand on to extend their reach into adjacent pens. Grain can be fed in the same feeders or in small buckets. Water is also usually given in buckets, although that can add up to a lot of labor.

After the lambs and the ewe have been together in the jug for a few days, they should be moved together with some other ewes and their lambs to a larger community pen. This setting will give the lambs a chance to learn to distinguish their mother from other ewes. The ewes do a brisk job of training by attacking lambs other than their own who try to nurse them or even approach them.

Mother and lambs soon learn to recognize one another by sound, sight, and smell. After a few days in a community jug, the whole bunch can be turned out to join the flock.

Some ewes are so protective of their lambs that they will injure other lambs, sometimes seriously. We had some ewes who broke legs and even killed strange lambs in an excess of motherly zeal. I cured them of this habit by treating them like sheep treat one another, that is by whacking them on the hard part of their skull with a board every time they tried to attack a lamb. After a few firm whacks, they left the other lambs alone. They were never quite bright enough to figure out that it was a board and not a lamb that was hitting them.

Even without nasty ewes, community pens are always somewhat of a three-ring circus, and it is helpful to have a place where the lambs can get away from the ruckus to sleep. All you need is what is called a creep area that is fenced off from the main pen by a panel with slots wide enough for the lambs to squeeze through but too narrow for the ewes. The use of a creep area for rest and relaxation at this early time in the lambs' lives is also good training because when you start to offer them solid food it will be in a similar setting. Even with newborns, it is good training to have some leafy hay and a little freshly ground grain mixture available in the creep area for them to experiment with.

All of the quarters should be well ventilated but not drafty. There are many variations on barn design, but a basic principle is to try to move air through to sweep away excess moisture and gases, mostly ammonia, from decomposing bedding. In cold climates, water or frost will condense on uninsulated ceilings and create a nuisance. The requirements of a barn are so much a function of local conditions that I don't intend to discuss barn design except to suggest that you visit other sheep raisers in your area, see what they do, and determine how they like their setup. Keep your eyes and ears open, and make your own judgments, because it is a human trait to defend one's own property or design even if it is deficient in some ways.

If you lamb in warm weather and choose to lamb in a pasture or lot, then maybe you don't want to bother with jugs. It is your choice. It is best to keep the ewes with lambs separated from those yet to lamb—the drop band—so move the ones with new lambs to a second lot or pasture.

With barn or shed lambing, when you turn ewes and lambs out of the community pens and into the flock, also keep the ewes with lambs separate from the expectant mothers in the drop band.

The ewes who are ready to lamb need peace and quiet, an environment difficult to maintain when lambs are around. In addition, the lambs will try

to suck on the ewes who haven't lambed yet, and many times the ewes will let them get away with it. This can deplete the ewe's supply of colostrum to the point where she may have none left for her own lambs when they are born.

HANDLING

At lambing time most ewes become calm and more trusting of a familiar shepherd. This greatly facilitates giving assistance if it is needed. Some of our ewes even seem to welcome a leg against their shoulder for them to push against when they are trying to birth their lamb, and they rarely show fear of humans during actual lambing. Others are wild of course, but most do calm down relative to their usual behavior.

First-Time Mothers

The major exception to this lambing time tranquillity is with first-time mothers, especially those who were bred as lambs. The signals that they get from the lamb's and their own hormones seem to confuse them, and they react by getting spookier than ever. It is a great stroke of luck if first-timers are in the lambing barn, where they can be confined when their time comes without their undergoing undue excitement. A large majority of them will lamb wherever they happen to be when the time comes, unlike older ewes who like being in the barn for the event. The wild ones seldom choose a place to the liking of the shepherd, but such is life. If the lambing is routine and no assistance is needed, you just wait until she lambs, then move in and take care of any needs. A flighty first-time ewe may run away in a panic if disturbed, leaving her lamb behind. If so, back away and let her come back to the lamb. In inclement weather you may have to get the lamb and ewe into the barn. Pick up the lamb by its front legs, and walk slowly away with it, letting the ewe see it and smell it as you go so she knows it is her lamb. As often as not the ewe will return to the spot where she lambed and sniff the ground, seeking her lamb. When this happens, start over again to try to tempt her to the barn. It helps to have a dog or another person shoo her toward you and the lamb. Each situation is unique, and some will really challenge your ingenuity. One can just give thanks for the occasional first-time ewe that behaves ideally and follows quietly into the barn without a lot of fuss and theatrics.

To reduce the problem of having a ewe lamb in a place that is not particularly convenient for the shepherd, it is useful to keep the drop band in a yard

right next to the barn so that lambs are not born in a remote corner of a pasture in the middle of the night where they are not noticed. The flock will soon learn to come in every night once they are used to the daily move. If they are reluctant to move at first, go out at night and approach them from the darkness as you talk to them or sing to them, all the time moving them toward a lighted yard or barn. Their night vision is not good, so they will move toward the light readily rather than rush off into the darkness. After a few nights of this they will move to the desired area as soon as they see you coming to herd them. Cold weather is your ally in this if the ewes were all sheared in late gestation, because they will go to the barn at night to keep warm.

ORPHAN LAMBS

Lambs may become orphans—or bidders, as they are sometimes called—for a variety of reasons. Some ewes die in lambing, leaving bidders. Other lambs have to be taken from their mother because she cannot nurse them, as is the case when one lamb is pulled from a set of triplets. It is an unusual ewe who can provide full fare for triplets, though many can. For one reason or another there are usually a few extra lambs to take care of, and the best thing to do with a bidder lamb is to graft it onto another ewe, that is, get her to accept it as her own lamb. I'll discuss raising lambs on artificial milk or other substitutes for ewes' milk further on.

Grafting Lambs

There are many ways to graft lambs, most of which fail because a ewe can easily identify her own lambs by smell, and she will promptly reject a stranger that the shepherd tries to foist off on her. We did have one ewe who would accept any lamb with alacrity regardless of its size, odor, or color. Most ewes, however, are not that agreeable and must be tricked into cooperation.

One hears of recommendations for forcing a ewe to accept a lamb by restraining her. The idea is to confine her in such a way that the lamb can get to the bag to nurse, but the ewe cannot step away or turn to hit the lamb with her nose or head. Such stanchion arrangements will allow the lamb to get some nutrition, but many ewes never accept the lamb no matter how long they are kept stanchioned. In my experience, stanchioning has limited application, though many producers swear by it.

Rather than using force, I prefer trickery for grafting. Almost every sheep raiser will tell you a “foolproof” way to graft, though of course no method can be totally guaranteed. One traditional technique is to graft a lamb to a ewe whose lamb has died by skinning the dead lamb and placing its skin over the grafter. The skin can be cut along the midline of the abdomen and the legs skinned out by pulling the skin off like a sock. Then the lamb to be grafted can have its legs slipped through the empty legs or else slits can be cut. This method seems to work most of the time.

There are also chemical approaches that depend on confounding the ewe's sense of smell or disguising the smell of the lamb. There are commercial preparations on the market for this purpose such as Franklin's Mother-Up. Odorous substances such as menthol creams, perfume, and pine tar all have their adherents. Although this method is widely talked about, I don't personally know anyone who has found it to be successful. A ewe's sense of smell is too good to be easily fooled or inactivated.

As far as I am concerned, there really is one foolproof method and I hope it will work for you. This method has two critical factors: first, the lamb to be grafted must be given to the foster mother before her own lamb is born and, second, the grafter must act like a newborn, be wet, and smell like a newborn.

If you are prepared, meeting the first qualification should present no big problems. Always keep in mind which lambs need to be grafted so you can act when the time comes. The orphan should be all ready to give to the ewe when her own lamb is almost born, in other words, hanging out and being pushed by the ewe.

To meet the second requirement, first tie three of the grafter's legs together with baling twine (another use for twine!) so that it cannot get up and run around and attack the teat like the veteran it is. In addition, the lamb should be completely wet, all over. It is much to be preferred if you can soak it with the ewe's own amniotic fluid. Have a small bucket ready, and pop the bag hanging out of the ewe into the bucket to catch the fluid. You can then sit the orphan in the bucket, tail-end first, and wet it all over with the birth fluids. If you did not catch any of the ewe's fluids, soak the orphan in warm water. Just before you present the grafter to the ewe, you can rub it over the exposed part of her own lamb to get a little odor on it. Using warm tap water works almost every time, and the use of the ewe's own fluids should give you a perfect record.

Ironically, what usually happens with this method is that the ewe has twins

and you have to take the lamb you just successfully grafted away to try on another ewe. One year we grafted a little buck lamb three times, and each time had to take him back because the ewe had twins. We finally got the poor little fellow a permanent mother on the fourth try, even though he was practically shopworn by then. You can take the twine off the adopted lamb's legs after the ewe's natural lamb is up and walking actively.

The tied legs and wet lamb trick will sometimes work after the ewe has had her own lamb, but the odds of success are much lower. Once she has smelled her own lamb, she is pretty suspicious of others. To aid in getting a ewe to take orphans after the fact, it sometimes helps to put a short panel with slots in it in one corner of the jug. That way the lamb can retreat to the corner to get away from her constantly checking its smell and hitting at it. Generally, the orphan and the natural lamb will sleep cuddled together in the protected corner so that their smells gradually mingle, and the ewe may eventually give up and accept them as a pair. I think that this method is much better than stanchioning the ewe, because the stanchion makes the ewe nervous and upset, which makes matters worse. With a hideaway, the orphans can escape from an aggressive ewe, and then can sneak out and get a meal when the ewe is otherwise occupied or distracted.

If all of this sounds like too much trouble to you, and you figure that you might as well just give the lamb milk replacer, let me assure you that it is worth the effort. A lamb will grow better and be healthier with real sheep milk and a mother's loving care. Not only that, the cost of ewe's milk is a fraction of the cost of replacer. You'll feed that ewe about five pounds of hay and two pounds of corn a day at a cost of about twenty-five cents. If you feed the bum a lamb replacer, it'll drink about two quarts, and those two quarts will cost you about a dollar. Even not counting the better quality of real ewe's milk, the ewe will feed two lambs for a fraction of the cost of one on replacer.

Bottle Lambs

If you are not successful in grafting a lamb onto a ewe or if you have extras for whatever reason, you will have to raise them to weaning on some sort of fluid diet. Remember to be sure that the lamb gets several meals of colostrum the first day before any other oral nutrition is given. After that it can be raised on milk or on a replacer. We have used goat's milk with success, and many growers use cow's milk, but neither one really is a substitute for the richer sheep's milk. We tried both goat milk and replacer and found that the lambs

prosper best on the replacer. The replacer of choice in the United States seems to be Land O' Lakes. I have made no comparative tests with other brands—which may be just as good or better—but the Land O' Lakes is said to be superior by many producers. Whatever brand you use, don't switch brands or even switch lot numbers of the same brand if you can help it. Lambs are very sensitive to changes in their diet, and I have heard of them refusing to eat replacer made from a different batch lot of the same brand.

Whether the lamb gets real milk or replacer, it is important that the shepherd limit consumption in some way. If lambs are fed from bottles, the shepherd must control the amount the lamb gets because too much will cause incurable scours.

Here is Teresa's schedule for bottle feeding; it has been highly successful for us.

First day: 1–2 oz. colostrum every two hours for at least four feedings
if possible
1–2 days: 2–3 oz. 6 times a day
3–6 days: 3–4 oz. 6 times a day
1–2 weeks: 6–8 oz. 4 times a day
3–4 weeks: 8–10 oz. 3–4 times a day
4–6 weeks: 12–16 oz. 3 times a day

This is a very conservative feeding schedule for small lambs such as triplets, quads, and up, and adjustments can be made according to the size of the lamb. Remember that it is better to underfeed than kill by overfeeding. However, a large, healthy, hungry lamb may progress through the schedule more rapidly.

A simpler way to limit feeding is to let the lamb feed as it does when nursing a ewe. If a lamb is given replacer in a self-feeder, it will eat when it is hungry and will seldom overeat. It is important that milk be available at all times so that frequent small meals become a habit. If the feeder is allowed to get empty, some lambs will gorge when it is filled. In addition, the milk should be kept cold, which not only prevents spoiling, but helps to limit the lamb's intake. To keep milk cold, ice packets or plastic jugs of ice can be floated in the milk to chill it without diluting it.

There are a number of lamb self-feeders on the market such as the Lam Bar, Nurs-Ette, and Orphan Annie. Many growers make their own feeders that can range from a nipple mounted on the side of a plastic pail to elaborate plumbing systems with centrally refrigerated milk storage and supply.



Life as a bottle baby is pretty nice in a clean pen with a free-choice milk replacer and ground feed.

We use five-gallon plastic buckets that we get from a local bakery to make inexpensive self-feeders. We buy Lam Bar nipples and plastic tubes and mount them in the plastic buckets by drilling five-eighths-inch holes in the side about seven inches up from the bottom of the bucket and inserting the nipples. If the lambs chew on the nipples with their molars, they will quickly ruin them. This can be prevented by spacing the nipples about four inches apart and putting little metal baffles between them. Fold a tab on one edge of a three-inch square piece of sheet metal and attach it between nipples to the plastic bucket using screws. We have found that in some years lambs will chew nipples, in other years not.

If your lambing weather is so warm that spoilage of the milk or replacer is a problem, the nipples can be mounted on the side of a plastic foam icebox by drilling the holes in a strip of metal that is screwed onto the side of the icebox. Some people even get so fancy as to mount a strip of sheepskin, wool side out, behind the nipples to give a sheeplike touch to the whole apparatus. Spoilage can also be inhibited by mixing 1 cc of formalin (get it at your drugstore) to each gallon of replacer.

Lambs will have to be taught to use the self-feeder. Some learn immediately, though others take repeated guiding to the nipples by a patient, though sometimes frustrated, shepherd. If a number of lambs are in an orphan pen together, the slow ones sometimes learn from the others who have figured out how to use the nurser.

LABELING LAMBS

If you have just a few lambs, you may have no trouble telling them apart. If the numbers get larger, or if you are raising look-alike purebreds, you will have to mark them in some way. I'm a believer in the value of records, and that pretty much means giving each lamb a number. Naturally, lots of sheep and lambs end up with names too, but names don't enter into records as easily as numbers, especially if you are using a computer to keep track of your sheep.

One sort of temporary numbering that can be done is to use paint to mark a number on the side of the lambs and their mother so that they can be kept together. Usually the ewe and all of her lambs are given the same number. There are paints on the market, made especially for this purpose, that will mostly scour off when the wool is washed. Branding "irons" made of cast aluminum are available. The branders are dipped into the paint and applied to the wool. The paint-branded numbers are really handy when you find a crying lamb all by itself being summarily ignored by mother. With a number on it and on her, you can get them back together promptly. The disadvantage of paint branding is that a residue of the paint does persist on the wool for as much as a year with some sheep. Even though this special paint does scour out, no handspinner will welcome it, and even commercial buyers commonly pay less for branded wool. Believe it or not, another disadvantage of the paint brands is that they disappear from some ewes in a week or two. It seems to depend on the type of wool.

Whether or not paint branding is done, there should be some more permanent method of identification. A tattoo can be put inside the ear by using a special tool and tattoo ink. This is not often done with lambs because it takes a considerable amount of time, especially if many lambs are tattooed. With breeding stock it is a permanent method that is very useful for sheep with pale ears. The ink is applied to the inside of the ear first, then the tattoo device is

used to puncture the numbers into the ear, and finally the ink is rubbed into the holes for a permanent ID mark. Do not overprint a failed try, as it will be unreadable.

Ear tags are a much commoner way of giving a sheep long-lasting identification. There are many types and brands of ear tags, and I won't attempt to be comprehensive but will point out a few principles.

For the lambs that are going to market, there is no point in investing a lot of money in fancy tags. The cheapest tag on the market as far as I know is the small brass type made by Ketchum. It is easily inserted using an inexpensive, special pair of pliers. The disadvantage is that it turns in the ear readily and can get to be very difficult to read without a lot of cleaning and twisting; this hurts the lamb so that it is struggling and fighting the whole time. Small Rototags are also good for lambs.

The next larger-sized tags, about an inch-and-one-quarter to an inch-and-one-half long, are made of aluminum or steel. These cost a bit more than the little brass ones, but they don't turn in the ear very readily. Large metal tags such as these are used by the breed associations to permanently mark registered animals. These tags are also inserted with special tools or with a common pair of pliers after a hole has been punched.

There are also metal tags with a circular portion that gives more space for information than a simple strip. This type is often used by research stations where the bookkeeping for a lot of different experimental flocks requires a lot of information on the tags. If you want to put quite a bit of information on a tag, don't forget that you can use the back side of the strip as well as the front. One can buy metal dies for impressing numbers and letters into tags, and the metal ones can also be painted for color coding.

Many different types of tags are made of plastic. These have the advantage of being available in a rainbow assortment of colors so that the color itself becomes part of the information. Plastic tags are handy, but they do have the disadvantage that the numbers wear off faster than on a metal tag. They also become brittle with age and exposure to sunlight and break. The sunlight damage can be minimized by placing them in the lower part of the ear to keep them shaded by the ear itself. Most manufacturers of plastic tags will imprint your name or the name of your farm on the back of the tag. Plastic tags require a punch or a special tool to insert them.

Finally, there are flexible rubber or soft plastic tags. These have an arrow-

head-shaped piece that folds to pass through a small slit in the ear but then will not pass back through the same slit (like a barbed arrow). The slit can be cut with a knife or punch or there is a special tool (of course!) that makes the slit, folds the tag, and inserts it in one squeeze of the handles. These tags come already numbered or can be ordered blank and marked with special marking pens, whose marks the manufacturers claim to be permanent. They are big enough for shepherds with poor eyesight to read from a distance, or, alternately, lots of information can be crowded onto them—birth date, dam, sire, breeding, and the like—so the sheep is almost a walking record book. These tags, being made of soft, pliable material, have less of a tendency to tear out of ears than other types.

Lambs can be identified by notching their ears, using a notching tool such as is used for pigs. There are various conventions used for notching, but one that uses a relatively few notches for a big range of numbers employs a binary counting system. If you are not familiar with a binary counting system, it uses the sum of a series of numbers—1, 2, 4, 8, 16, 32, 64, 128, 256, 512, etc.—to indicate a given value. To give you an example, the binary number 11010 is the same as 26 because, reading the binary number from right to left, it means the sum of zero ones, one two, zero fours, one eight, and one sixteen equals twenty-six: or $(0 \times 1) + (1 \times 2) + (0 \times 4) + (1 \times 8) + (1 \times 16) = 26$. With only ten notch locations one can number up to 1,024 lambs. A notch can be used to indicate a one and no notch to indicate a zero. One notch at the tip of the ears and two notches each on the top and the bottom gives a total of ten locations. You will find that the lambs flinch quite a bit at each notching, so cutting up to ten notches may not be your cup of tea.

Some raisers use an ear notch or simply cut off the end of an ear to indicate that a ewe lamb is a twin or a triplet and should be saved as a replacement rather than shipped to market. Such a marking system is better than nothing, perhaps, but it does make the shepherd focus on only the fact that the ewe is one of a multiple birth. This may well be a plus, but the real question is not whether she was a twin or a triplet but how fast she grew and what sort of a track record her mother has, as an estimate of how good a producer she might prove to be. One wonders how many inferior ewes are retained just because the tip of their ear was cut off when they were born, when their productive, single-birth mates get culled.

The thoroughly modern shepherd can even implant ID chips in the ears

for about seven to eight dollars a chip. You will need an electronic reader to use them. Such chips are used in some scrapie reduction programs. As with tattoos, such chips are for breeding stock, not lambs.

Whatever method you use, I urge you to label your lambs in some way: this will encourage you to keep good records of the lambs so you can identify your best ewes. Records make the long-term difference between profit and loss.

Detailed records are more difficult to keep in some situations. I refer to range flocks that are seldom located where tagging, weighing, and the like are very convenient. In days past, ewes had their lambs in the shelter of a sagebrush and took care of themselves and their offspring. In such a situation, a ewe that had a vigorous single lamb was actually preferred, and twin and triplet producers were culled to be sold to farm flocks or to market. Today, most range flocks are lambing out in shelters or yards of some sort and are ear-tagged and handled much as one would a farm flock. The big difference is that the flock moves around quite a bit on four feet, and a robust, single lamb will keep up better than a weaker pair of twins. A lost lamb is often abandoned or given away to a passerby because there is no way for the herder to locate its mother, and it certainly can't be raised on milk replacer on top of a mountain in Wyoming. Low lambing rates are tolerable with range flocks, since the investment per ewe is smaller than with farm flocks because of the low investment in facilities.

TAIL DOCKING

At the same time that ear tags are applied, a day or two after birth, the lamb's tails should be removed (docked). There are a few shepherds who have objections to docking lamb's tails. These people tend to be the ones who think that everything in life should be natural, and they cannot bear the thought of hurting the hapless little lamb by absconding with its tail. I will not question their motives or the genuineness of their sentiments, but I do think that their ideas bear examining. In the first place, a sheep is not "natural." Sheep have been domesticated for at least ten thousand years, and probably for a lot longer, and bear almost no resemblance to their wild precursors. They are a product of man and of civilization and should be treated as such. They need assistance from a shepherd, and that includes docking. An undocked lamb

will accumulate feces under the tail if its droppings are anything but dry pellets, as is commonly the case during a lamb's first weeks. Except in midwinter, flies will lay eggs in the dung pad under the tail, and maggots will hatch out. When the maggots have consumed the feces, they will go after the lamb. You can't tell me that the maddening irritation and pain from maggots under the tail is better than a moment's distress when a tail is removed. Not only that, a plug of dung under a tail can stop up the lamb like a cork, and it will be very uncomfortable or worse.

There are breeds of sheep still raised in the Middle East and Asia that have very large, fat tails. These sheep are raised in part for the tail itself, which is considered a gourmet delicacy and a source of cooking fat. If you are a member of the ancient Samaritans who live still in Israel or of some other group that prizes the tail of a sheep that literally comes dragging its tail behind it, then, and only then, can I understand your not wanting to dock. Otherwise, I think docking is the humane and sensible thing to do. If an economic incentive is more meaningful to you, you should be aware that lambs sent to market are discounted a dollar a hundredweight (cwt) for undocked tails. In other words, you are docked for not docking, and you will probably get a poorer price for your lambs overall because the buyer considers tailed lambs a sign of poor management.

Docking a lamb tail is a quick and simple operation. I prefer a docker that is heated either by electricity (Meador's TNSC) or propane (Primus BJ5000). The heated cutter is used to sever the tail between vertebrae with a slow-cutting action. The tail comes away cleanly and the heat serves to cauterize the wound, which both reduces the risk of infection and reduces bleeding. To locate a place between vertebrae, just feel the tail with the fingers. A single vertebral bone is spool-shaped with ridges at each end. The space between two vertebrae is a ridge around the tail. Push the loose skin a bit toward the body of the lamb before you cut so there is some excess to cover the wound and speed healing.

Have someone hold the lamb for you, or hold it between your ankles, and dock away. If there is excessive bleeding, touch the hot cutter lightly to the bleeding place to seal it off. I like to avoid cutting too close to the rear of the lamb, and I tend to cut where the wool starts under the tail. Some advise removing the tail just to the tip side of the place where the two tendons that hold the tail come together in a V. No matter where you cut, do it between tail vertebrae. It is simple to feel where the spaces are. Show sheep used to be

docked right up to the body for the sake of appearance. This practice is now widely frowned upon and not even allowed in some states. There is considerable evidence that short docking increases the risk of rectal prolapse.

If you don't like the idea of a heated docker, there are tools called Burdiz-zos and dockers that are used to crush and/or cut the tail. The Burdizzo crushes the tail, thereby restricting the flow of blood in the tail so that it atrophies and eventually falls off. The crushing-cutting type cuts off the tail and at the same time crushes the stub to reduce bleeding. Be sure to hold the tool correctly so you don't crush the cut-off portion instead of the stub.

Yet another way to dock a tail is to apply a small, strong rubber band with a tool called an Elastrator. The squeezing of the band cuts off blood circulation, and the tail eventually falls off. If one can judge from the behavior of the lambs, this rubber-band method seems to produce the most discomfort of the various methods.

The absolutely worst way to dock a tail is to cut it off with a sharp knife. Not that this is any more painful to the lamb, for it may well be less painful. The big disadvantage is that profuse bleeding often follows such a clean cut. Blood will squirt out in far-flying pulses, and bleeding from a severed tail is very difficult to stop. I know of shepherds who have lost lambs from bleeding to death as a result of tail docking. Letting a lamb die from improper docking is a spectacular example of poor management. Blood stopper may help reduce bleeding from any dock.

Infected Docks

Regardless of the method used, there is some risk of infection from docking. There is a bacterium of the genus *Corynebacterium* that is present around most barns and yards and readily enters a fresh wound such as a tail dock, shearing cut, or scratch. The electric docker is helpful in reducing infection but will not eliminate it altogether. The stub can be dipped in iodine as a preventive measure. Alternatively, the lamb can be given an injection of penicillin to prevent growth of *Corynebacterium*, which is especially sensitive to that antibiotic. If management and weather permits, the lambs can be turned out to a clean pasture where the risk of infection is practically nil. Do check the stubs to see that they heal. To treat an infected tail, thoroughly wash and clean it with soap and water, apply iodine, and give the lamb a penicillin shot.

Be sure to give the injection, *and all injections to young lambs*, subcutaneously (under the skin), even if the instructions on the bottle say otherwise.

Absorption of the medication will be a little slower, but you will avoid the risk of causing crippling nerve damage from an IM injection in a tiny lamb.

If *Corynebacterium* invades the body of a sheep it forms abscesses in lymph nodes and elsewhere, giving a disease called caseous lymphadenitis (CL) that causes wasting away of the sheep as more abscesses form in her body. There is no cure, but a new vaccine called Casebac or Casebac DT appears to be fairly effective. The strain of *Corynebacterium* causing CL appears to be introduced when an infected sheep is brought into the flock. If you have the problem, talk with your vet to set up a culling and vaccination program.

Tetanus

The other potential infection risk is from *Clostridium tetani*, causing tetanus. This microorganism, like all of the clostridia, is an anaerobe—it lives in the absence of air. There is little risk of *Cl. tetani* infection with the heated docker or cutting methods. However, such infections are fairly common with cut/crushing and even more so with Elastrator bands. Naturally, no bacterial infection will occur if the bacteria are not present. If you are not sure whether or not *Cl. tetani* is present on your property, you might elect to ignore the possibility of tetanus and treat cases as they arise, if they do arise.

If symptoms are detected early, treatment will usually be successful. Affected animals become paralyzed in the hind quarters. The tail may be stiff, ears erect, eyes staring, and swallowing and breathing may be affected. The animal may be startled by loud noises or sudden movements.

Treatment consists of large doses of antitoxin together with penicillin to reduce further growth of the bacteria. The site of infection should be cleaned out completely and washed with hydrogen peroxide solution. Some veterinarians will also administer tranquilizers during recovery. The treatment of an affected animal is usually not economically justified, however, since the medication costs more than the value of the lamb in most instances. We have saved some young lambs by treatment as above.

If *Cl. tetani* is known to be present on your property, prevention is much easier and cheaper than trying to cure sick animals. If the ewe is vaccinated prior to lambing, the lambs will have received protective antibodies from colostrum and will be able to fight off infection. With this method, the ewes should be vaccinated each year a few weeks before lambing. Vaccination of ewes is probably the cheapest protection if tetanus is a major problem for you. There are inexpensive vaccines that build ewe immunity for both *Cl.*

perfringens (C & D) and *Cl. tetani*. If ewes were not vaccinated, one can give each lamb 100 IU of tetanus antitoxin at docking or castration, but that is more costly.

Flies

Finally, the dock should be protected against flies if it is fly season. Flies will lay eggs in any dead tissue, and the maggots will cause irritation and even death in severe infestations. Try to avoid fly season by early docking. If your lambing schedule makes that impossible, spray the stub and surrounding areas with a fly repellent. Some sprays contain both a repellent and an insecticide to take care of the individual flies that ignore the repellent.

CASTRATION

Just as there is disagreement about docking of tails, there are all shades of opinion about castration of male lambs. Many male lambs that are destined for slaughter have traditionally been castrated, that is, converted to wethers. The commercial lamb markets are set up on this assumption, and ewe and wether lambs are generally bought at the same price. Depending on the season of the year, the part of the country, the buyer, and a host of other factors, ram lambs can command the same price as ewes and wethers, although more typically they are discounted for their maleness. Discounts vary, but can be substantial. In the American market, ram lambs are lumped with ewes and wethers until early to mid-summer, at which time a discount of two or more dollars per hundredweight is applied to finished ram lambs being sold for slaughter. Lambs sold as feeders can be discounted much more severely for being rams because of the nuisance they cause the feedlot operator.

The packers object to uncastrated lambs for a number of reasons. As uncastrated lambs get older, they gradually develop male characteristics that the packer doesn't like. As maleness becomes more evident, weight is added at the shoulders rather than the more valuable loin and hind legs. The skin becomes more difficult to remove over the shoulders, which costs time at the slaughterhouse. Furthermore, the thin membrane covering the meat may be torn, which results in extra weight loss from the drying of that part of the carcass. With older uncastrated lambs, the fat becomes yellow in color instead of white, and there is resistance to this at the retail level. There is also, of course, the weight of the scrotum and testicles, which have little market value in some areas.

Lamb feeders do not want uncastrated lambs because their sexual activity in chasing and trying to mount ewe lambs and one another disrupts the peace and quiet of the feedlot, with resulting reductions in rates of weight gain. Some feeders have facilities to house males separately and will tolerate them, but they still will not pay as much for entire rams as they will for wethers.

There are also disadvantages to the shepherd from not castrating. Like the feedlot, the pasture or barnyard will be a lot more active with uncut males chasing around. Worse yet, some of the uncut rams may breed some of the early-maturing ewe lambs. Even if the ewe was one that you wanted to keep as a replacement for the flock, you would want to breed her to the ram of your choice at a higher weight and later age. Breeding a youngster to a scrub ram lamb is no way to improve the flock.

With all of these considerations indicating that castration is in order, is there any reason even to consider not doing it? Yes, there is. The big reason to avoid castration is that it causes a setback in the growth of the lamb at the time of castration. In a business where fast growth on the least feed spells the difference between profit and loss, the slowing of growth at castration can be significant. In addition to the reduction of growth for a short period, entire rams grow faster on average than their castrated counterparts, all else being equal. If a ram lamb grows 10 percent faster on the same feed consumption, but is then docked 5 percent at marketing, you are still ahead of the game relative to making wethers. Also, if you count labor as a cost, the time and expense of castrating is eliminated altogether by keeping ram lambs entire.

In a study by A. L. Slyter at South Dakota State University, growth of rams and wethers was compared. One group was weaned at 90 days and put on feed, a second group was weaned at 120 days and finished on feed, and a third group was left on pasture with the ewes. Over two years of trials, the ram lambs averaged 11.5 percent, 4.6 percent, and 3.2 percent heavier than wethers in the three groups. The grand average for all test groups showed ram lambs gaining 6.4 percent over their wethered cohorts. If lambs were worth \$60 per cwt, the discount for rams would have to be almost \$4 to favor wethers. For the group weaned at 90 days, it would have to be nearly double that. Also, interestingly enough, over the two years of the trials, the wethers ate about 20 percent more feed in the feedlot, although gaining less weight than the rams.

With some flocks, castration is avoided because the shepherd hopes to sell rams as breeders. This is a judgment call, because only the breeder's past experience can tell him how many rams he can expect to sell. If wishful thinking

overwhelms realism, the ram breeder may end up with a lot of rams that he doesn't have a buyer for and will take a beating at the slaughter market.

One compromise is to castrate some and not others. Any rams that can be expected to reach market weight and finish before discounts are applied in July or so can be left entire. Later lambs can be castrated to avoid the dock for entire rams.

Yet another possibility is to turn the rams into cryptorchids or "crypts," also called short-scrotum rams. A cryptorchid is a ram with the testicles remaining in the body cavity instead of down in the scrotum. Some rams are born this way, and the testicles never descend or are pulled up later. Most crypts are man-made, however. The usual method is to use Elastrator rubber bands. The testicles are pushed up into the body, and the band is applied to the scrotum. The scrotum falls off eventually, leaving the testicles in the body cavity. When the testicles are pushed up, the shepherd should hold the surrounding tissue so the attachment of the testicle to the inner part of the scrotum (the tunica vaginalis) is pulled loose. Also, the band should be placed as close to the abdomen as possible to do a neat job. Crypted rams are usually sterile because the sperm cannot tolerate the high temperatures inside the body. Insofar as hormone production is concerned, the crypt lamb remains the same as an entire ram lamb and will show male body conformation and respond sexually as a male. Thus, cryptorchid males will create the same uproar in your barnyard as a ram lamb, but at least they won't get the ewes pregnant. If you do crypt your lambs, in all fairness to the feedlot operators you should finish them yourself rather than foist them off as wethers.

The big plus for cryptorchid lambs is that they grow at least as well as entire ram lambs, and there are reports that they grow better. Also, they will be treated as wethers at most markets, even when penalties on rams are applied.

The decision whether to castrate is one that only you can make. You should check with local buyers to see what the market demands. Some markets will accept only ewes and wethers and won't take ram lambs at any price. Other places don't care. Some of the packing houses don't want rams at all and wouldn't buy any if they thought they could get away with it. There is still enough competition, however, so that they cannot dictate completely to the shepherd.

An important exception is the increasingly important Muslim market. Most Muslims prefer entire rams, and will pay extra to get them. If you can develop a local market among Muslim customers, you will, of course, not cas-

trate. There are even some packing houses now buying for the “ethnic” market that have no objection to entire rams.

Many raisers in our area leave January and February lambs as rams and castrate later ones in order to accommodate market demands. We mostly castrate except for purebreds and exceptional crossbreds that we reserve for sale as breeding stock. When we have crypted, we have never been docked for the crypts, but our crossbreds are of a breed that is slow to show heavy masculine shoulders and neck. Ram lambs that show their maleness early probably should be castrated unless you are willing to take a chance on getting a higher total net profit even with a ram discount at the marketplace.

Castrating is done in a variety of ways, as you might imagine. The testicles can be removed entirely by pushing them up into the body, cutting the scrotum at its widest part with a sharp knife, then pulling the testicles until the cords holding them break. Pulling them is easier said than done, because they are slippery, and getting a grip is not always simple. Some shepherds use a toothed, plierslike tool to grasp and pull the testicles. The traditional way is to grasp them with the teeth, pull, and spit them into a waiting bucket. Usually one person holds the lamb and the other cuts and pulls. The severed testicles should be saved for a gourmet treat of “mountain oysters.” Remove the outer covering and fry them or prepare them as you would sweetbreads. If the idea doesn’t put you off, you’ll find that they are a treat.

Elastrator bands can be placed over the whole scrotum, including the testicles, to pinch off the cords to the testicles and the scrotum. In some lambs, the testicles may not have descended into the scrotum, so push with your fingers on the abdomen in front of the scrotum to pop them into the sack, and then apply the band. Take care not to pinch one of the little teats in the band, and make sure that both testicles are fully into the scrotum and not caught partly by an Elastrator band.

A Burdizzo can also be used to crush the cord leading to the testicles, resulting in a loss of blood supply and atrophy of the testicles. Crush each cord twice to double your chances of getting the job done successfully. Have a veterinarian or someone who is experienced demonstrate the use of a Burdizzo to you because it won’t work if it isn’t done correctly. This is the preferred method for older rams.

As to when to castrate, the answer is as soon as possible. Very young lambs seem hardly to notice that anything has happened to them, although they may walk stiffly for a few days. The longer you wait, the harder it is on them

and the bigger the growth setback they will suffer. Try to do them while they are still in the jugs, no later than day three, and you will cause fewer problems for both the lamb and yourself. If the lamb is weak or sick, castration should be put off until it is healthy and strong. The possibilities of infection are the same as for docking, so do both procedures at the same time and take the necessary precautions. If you cut the scrotum, be sure that the wound drains and does not seal up and become infected. Open and clean any scrotums that seal over.

MEDICAL

The Ewe

The principal cause of concern for the ewe at lambing is damage to or infection of her uterus and vagina. With a normal, unassisted birth there is little likelihood of any problem, but if the shepherd or veterinarian has to insert a hand and arm inside the ewe to assist in lambing, there is always the danger of damage or infection. Damage can be minimized by being sure that your fingernails are short and by being very gentle and careful when working inside the uterus. You may have to use considerable force to pull a lamb that is in an awkward position, but that doesn't mean using abrupt movements or violent yanks and twists. Just keep calm, work slowly and carefully, and damage is unlikely.

For cleanliness, wash your hand and forearm or wear gloves of some sort. Veterinarians commonly use a shoulder-length rubber glove to shield their whole arm, but the average shepherd doesn't generally have those. A good scrubbing, including under the fingernails, will usually suffice.

There are boluses—usually made of a combination of the chemical urea and one or more of the sulfonamides (sulfas)—that are intended to be placed in the uterus after an assisted birth or after an inspection with the hand and arm. Our vet thinks that these are of value only to help the peace of mind of the shepherd and do nothing at all for the ewe.

After an assisted birth we commonly give an injection of an antibiotic to help ward off infection, especially if a lot of work was needed. Some authorities recommend an injection of oxytocin to contract the uterus and ward off uterine prolapse, as well as to help in expelling afterbirth tissues. Follow your veterinarian's recommendations.

If a ewe has a vaginal prolapse after lambing, she can be treated as described in Late Gestation. Be sure to treat the cause of the prolapse, such as infection, because unlike the vaginal prolapses prior to lambing you can't blame this on lack of room inside the ewe. Some authorities say to cull any ewe who prolapses after lambing. We have kept ewes who prolapsed after their first lambing, and they have never done it again.

The big problem that arises occasionally is that not only will the vagina prolapse, but the entire uterus will evert. It is a large red body of tissue that has knob- or buttonlike structures (cotyledons) over its surface, and it will hang from the prolapsed vagina in most cases. If you want to try to push it back in yourself, wash the whole mass with a mild detergent and warm water. If it is really swollen, sprinkle a pound of granulated sugar over it to help shrink it for easier replacement. Hang the ewe by her heels, or have an assistant hold her, lubricate the uterus and push it back in carefully. When it is replaced, be sure that it is completely back, and not still partly inside out as it was when it was outside of the ewe. If it is not completely back in a normal configuration and position, it will come right back out again. In fact, it may come out even if you get it in correctly.

Once the uterus is back inside the ewe, give her an injection of oxytocin, suture across the vulva to keep everything inside, and put on a twine harness as described in Late Gestation. Then pray or cross your fingers. Ewes frequently die from internal bleeding after a uterine prolapse, but you should try the rescue operation anyway. You really have nothing to lose, after all. If you prefer not to try this sort of major operation, check with your vet on the fee because the rescue may cost more than the value of the ewe.

Be alert for any signs of milk fever as described in Late Gestation. This is not common with sheep, but heavier milking breeds and individuals are susceptible, so be alert. It is easy to treat when caught early.

The Lambs

The newborn lamb has left the comparative safety and protection of its mother's uterus and is exposed to the dangers of the world. In a lambing barn the shepherd has removed physical dangers such as predators and cold temperatures, but there are still biological dangers.

The lamb is subject to infection by a myriad of pathogenic organisms. Its defenses against invasion by these freeloaders are complex, but the immune system figures prominently. A newborn lamb is capable of having an immune

reaction against an invading organism as soon as the lamb hits the ground. It is said to be immunologically competent, in the sense that all parts of the immune system are present and in working order. However, the immune system needs time to react because even though the immune system is present, building immunity to any given organism takes at least a couple of weeks, so for the moment the little one is essentially unprotected.

The immune defense that the lamb can use right away is the chemicals called antibodies. It receives these from the ewe in the colostrum it drinks during the first couple of days of life. Antibodies are large protein molecules that are able to attach themselves to specific bacteria, viruses, or other microorganisms in the blood or in the lymphatic system and either inactivate them or aid in their destruction. There are also antibodies that attach to and neutralize toxins that may be produced by growing organisms. The temporary immunity given by the antibodies from the ewe's colostrum is called passive immunity. It lasts only as long as the unused antibody is present in the lamb's body, because the lamb does not replenish the used antibody automatically.

Antibodies are very specific in their action; they are able to attach themselves only to a single type of microorganism or toxin, or in some cases to very closely related materials. The antibody has a cavity at one end that is made of amino acid building blocks in a unique configuration that will link only with a matching projection on an object such as a bacterium. Thus, if the antibody is effective against bacteria A, it will be ineffective (or at least not totally effective) against bacteria B. Antibodies are formed in response to proteins called antigens that are unique to each type of organism. It is sometimes said that each organism or other object has its own characteristic antigenic signature.

An antibody that is specific against bacteria A was originally formed in response to the presence of some of bacteria A in the sheep's lymphatic system. Thus, the ewe's colostrum will contain antibodies against every antigen that her immune system has ever encountered in her entire lifetime, which means against every pathogenic organism that has ever infected her, whether it made her sick or not. For this reason, colostrum from an old ewe is better protection for a lamb than that from a young ewe, because the old one will have encountered more antigens in her longer lifetime than the youngster.

The Immune System

Armed with a mother's antibodies, the lamb is able to control attacks by pathogenic organisms. At the same time it begins to build its own defenses as its immune system encounters antigenic material. The immune system is highly complex, and research in this field has been rapidly expanding over the past decades, but some generalities are agreed upon by immunologists. First of all, there are key parts of the immune system that are able to distinguish between self and nonself tissues. The immune reaction is against nonself material of any kind, whether it is a virus or an intestinal worm or a toxic molecule.

There are two tasks accomplished in an immune reaction. One of these is to form antibodies that attach to foreign bodies, and the other is to attack them with special sorts of white blood cells. These two types of response are called antibody-mediated and cell-mediated. Both responses have their origin in the bone marrow, where the so-called stem cells are manufactured. These develop into lymphocytes and macrophages. The lymphocytes subdivide into one population that passes through the thymus gland to emerge as T cells, and one population that does not, called B cells. The macrophages also split into two groups, some that attack and eat foreign bodies and some that process antigens for the other cells.

The four types of cells act together to give a broad attack on invading antigenic bodies. Macrophages attach antigens from the nonself material to themselves and pair them with other proteins called immune genes or I genes. The pair, consisting of an antigen and an I gene, is presented to T cells of a type called helper- T cells (T_H cells). The T_H cells then carry the antigenic message to other T cells called killer- T cells or effector- T cells (T_E cells) as well as to B cells.

B cells that get the message from a T_H cell change into large cells called plasma cells that generate large quantities of antibody that is specific for the antigen delivered by the T_H cell. Some of these antibodies, called immunoglobulin gamma or IgG, enter the blood and lymphatic system and attach to and neutralize any foreign bodies that carry the identifying antigen. Others, such as the delta type, IgD, remain on the surface of the cell that produced them and do their work there. Yet others, like IgE, function to fight internal parasites such as worms but can also trigger harmful allergic reactions. There are many more types of immunoglobulins.

T cells that get the T_H message perform two main functions. The killer T_E cells attack and destroy cells that bear the identifying antigenic signature.

T cells produce substances called lymphokines that have wide effects. They convert some macrophages into phagocytic (cell-eating) cells. Lymphokines also attract leucocytes and macrophages to parts of the body that are under attack by nonself organisms or other material and cause an inflammation as the foreign bodies are destroyed or inactivated.

Once *T* and *B* cells have been given the antigenic signature of a particular antigenic substance, they retain this information. The *T* and *B* cells are also very long-lived cells, so the “memory” of a particular antigenic object is carried in the sheep’s body for many years. When one of the coded cells encounters its own special antigen, it responds by enlarging into a large cell called a lymphoblast that then subdivides into numerous exact copies (or clones) of the original cell.

In the case of T_E cells, the immune response is very rapid. Each T_E cell that encounters its special antigen is very rapidly formed into a huge number of additional T_E cells that go about this business of attacking the antigenic material, forming lymphokines, and so forth.

Response of the *B* cells is somewhat slower because they first have to go through the process of cloning; then the clones have to form plasma cells that actually make the antibody that attaches to the antigenic material. It is the relative slowness of this process, a matter of a couple of weeks or so to build high antibody levels, that makes the passive immunity from the ewe so valuable to the lamb. The presence of the passive antibody gives a grace period during which the lamb’s immune system can make its own antibody and acquire active immunity.

There is one hitch in this whole system that may have occurred to you by now. A lamb cannot build active immunity to an antigenic material until it has been encountered by a macrophage (actually many of them) to start the whole process of the immune response. As long as the lamb’s active immunity is built while it still has passive immunity from the ewe, all is well. If the lamb is attacked by a pathogenic organism when it has neither passive nor active immunity, it may well get sick or even die before the immune system can respond. If it survives the attack, it will be able to respond rapidly to future invasions, however.

Immunization

This is where vaccination or immunization enters the picture as a practice to prevent disease. Vaccination is named from the name for the cowpox virus,

vaccinia, which was used to give immunity to smallpox. People who had been infected with *vaccinia* were found to be immune to the smallpox virus, and intentional infection with *vaccinia*—that is, vaccination—was used for many years before anyone understood why it worked. *Vaccinia* is either a mildly virulent form of the smallpox virus or has a similar enough antigenic signature to the smallpox virus that the immune system responds to the smallpox virus after “learning” the cowpox signature. The term “vaccination” gradually came to be used for any immunization against a virus and is now generally used loosely to mean any immunization against a virus, bacterium, chlamydia, or other pathogenic organism. What all vaccines have in common is the ability to prepare the immune system for rapid response to an invading pathogenic organism without actually causing the disease.

For example, a bacterium or virus can be killed or chemically weakened so that it cannot multiply and cause infection or disease. The killed or weakened organism will still carry the antigenic message on its surface, however, so it is still capable of stimulating the immune reaction, even though it causes no illness. Organisms can also be weakened in other ways so as to make them harmless. This is done for some viruses by growing them on the tissue of a different species than the one to be protected. For example, a virus can be grown on horse cells in such a way that it becomes very virulent for horses, but loses its ability to attack sheep cells. This attenuated virus can then be given live to a sheep to build immunity without making the sheep sick. Or, the poisons produced by a pathogenic organism can be chemically altered to be nonpoisonous, but still carry the same antigenic signature so that immunity to the toxin can be built without actually poisoning the animal.

Lambs can acquire immunity to common sheep diseases through appropriate vaccinations. Then their immune system is prepared to react quickly if the specific organisms for which it is immune are recognized by the patrolling *T* and *B* cells.

Sheep are vaccinated for some common lamb diseases prior to lambing so that antibody levels in their colostrum have time to build to high levels at lambing. Thus, the ewe is vaccinated for the protection of the lamb yet to be born. Also, of course, both lambs and adult sheep are commonly vaccinated for their own protection.

Vaccinations are effective as long as there remain a significant number of the appropriate *T* and *B* cells still present in the sheep's body. In order to keep their numbers high, annual or less frequent boosters are given for some

diseases. For other diseases, a single vaccination appears to confer lifelong immunity. Recommendations for different diseases and different types of vaccine are not all the same, so be sure to read labels and consult with your veterinarian about your immunization program. It is important to give the recommended dose of a vaccine. Do not reduce the amount for lambs. Generally, all vaccines are given in two doses, with the second one two to three weeks after the first. Insufficient vaccination can invite disease. On the other hand, too frequent vaccination costs a lot of money, can trigger harmful side effects, and should be avoided if it is not really needed.

Vaccines, Etc.

There are a number of different preparations that are used for immunological treatment or prevention of disease. In current usage a vaccine means any material that can be used to stimulate an immune response without giving a full-blown case of the disease. Some vaccines, such as sore-mouth vaccine, are actual live viruses of full virulence. Others, such as various types of rabies vaccines, are viruses rendered noninfective by some means. Still others are killed bacteria called bacterins, such as those used to vaccinate against vibrio. Some are inactivated toxins called toxoids, such as those used to prevent enterotoxemia caused by *Clostridium perfringens* toxin. There are also materials called antitoxins (these are not the same as toxoids) that are mixtures of specific antibodies that attach to and inactivate a given toxin or set of toxins. An injection of antitoxin gives short-term passive immunity in much the same way that sucking colostrum gives passive immunity to a lamb. If an active case of the disease is present, antitoxins can be used as a therapeutic measure along with other treatment to control growth of the pathogen. Antitoxins are commonly used against tetanus and enterotoxemia.

The question sometimes arises as to whether a toxoid and an antitoxin can be administered at the same time. After all, won't the antitoxin just neutralize the toxoid? Yes, but not until the toxoid has had some minor effect. However, the beneficial effect of the toxoid in building immunity will be greatly reduced.

Another question is whether antibiotics can be used at the same time as an immunological treatment. You bet they can. In fact, without participation of an animal's own immune system, fighting off sickness with just antibiotics is pretty much useless. Antibiotics are great, but what they really do is to sufficiently inhibit the growth of pathogenic organisms so that the immune system can do its job.

The body has other defenses against invasion by pathogens such as the skin, active membranes in the mouth, nose, and other openings, tears in the eye, sweat, and so forth. The immune system does not protect against everything. Pathogenic organisms can live in the intestine of a sheep and cause neither disease nor an immune reaction. For that matter, consider that a lamb is nonself to a ewe's immune system, yet the fetus is not destroyed by an immune reaction from the ewe because the fetus is protected. Also, some pathogenic organisms have coatings that inhibit recognition of their antigenic signature, so they largely escape the immune response. Yet others change their character rapidly to escape detection by the immune system.

Chemotherapy

Chemotherapy is a general term meaning medical treatment using chemicals (what most of us would call drug therapy). The sulfonamides or sulfa drugs were the first major group of drugs discovered that could be used to help the body fight disease—the first of the so-called miracle drugs. They function by inhibiting paraminobenzoic acid, an amino acid that many microorganisms need to grow and multiply. The sulfas don't actually kill the microorganisms that are producing a disease; they inhibit their growth until the lymphocytes act to destroy them. Sulfas are mostly excreted in the urine and can cause kidney damage if the animal is not provided with sufficient water. In using sulfas be sure to follow label directions for length of treatment so as to limit adverse side effects. Some sulfas are not readily absorbed and therefore act mainly in the gut if given orally (sulfasuxidene, sulfathalidine, sulfaguandine) whereas others are readily absorbed (sulfathiazole, sulfamirazine, sulfamethazine). Don't give a sulfa unless you are sure you are using it for the right purpose. Check with your veterinarian to be sure.

Various compounds produced by microorganisms and their synthetic analogs are called antibiotics, the best known of which is penicillin. Some types (penicillin, bacitracin) are bactericidal—that is, they kill the bacteria or other organisms, principally by effects on the cell walls or cell membranes. Others are bacteriostatic in the same way as the sulfas, in that they affect protein synthesis and retard growth rather than actually killing the organisms (tetracyclines). It is not advisable to use a bactericidal antibiotic together with a bacteriostatic one because their actions do not complement one another.

Penicillin comes in a vast variety of forms, and your veterinarian may have good reason to prefer one type over another for any given health problem.

The common over-the-counter type is penicillin G, usually with procaine to slow absorption. There are also quick-acting types and others that are released very slowly to reduce the need for frequent treatment. It is very rare that a single treatment with penicillin or any antibiotic is called for. In most instances a series of doses is given, and the whole recommended series should always be given. Also, be sure always to give the full recommended dose, because a smaller dose has the effect of helping the microorganisms build immunity to the drug. Certain species of the genus *Streptococcus* developed the ability to secrete an enzyme that destroys penicillin, and this penicillinase-producing gene has appeared in other bacteria, by transfer from the strep species that “developed” the gene, much like an inventor licenses a process to manufacturers. Giving full doses and the whole course of treatment helps limit development of resistant strains with the penicillinase gene. Penicillin is mostly effective against a class of bacteria called gram positive and against chlamydia.

The tetracyclines include chlortetracycline (Aureomycin), oxytetracycline (Terramycin, Oxy-tet), and plain tetracycline. The commonest one is oxytetracycline as the hydrochloride. It is readily absorbed from the intestinal tract and is also given by injection. Even by injection it can have adverse effects on the rumen microflora. The action is bacteriostatic. Many veterinarians prefer tetracyclines for respiratory diseases. Because of their ability to be readily absorbed in various parts of the body, they are also used to treat infections of the brain that are unreachable by most medications because of natural barriers.

There are long-acting versions of both penicillins and tetracyclines, which means one does not have to catch and treat the animal as frequently. A long-acting tetracycline called LA200 is widely used.

The shepherd should realize that no antibiotic has any effect whatsoever on viruses or fungi. In some viral diseases, such as sore mouth, antibiotics are sometimes given to help prevent secondary infection by bacteria. Antibiotics are only effective if the right one is used at the right time in the right dosage. This usually means using them on the advice of your veterinarian unless you have had a great deal of experience and can recognize a given condition for which you know the appropriate drug and dosage.

There are many antibiotics and other drugs that are available only from veterinarians or by prescription, and those may be the drug of choice, so don't just use what you can buy off the shelf at a farm supply store because you

think you'll save a few dollars. You may lose the animal or fail to stop an epidemic in a flock by inappropriate treatment. Be cautious until you really know what you are doing.

Early Vaccination

After that little side trip into immunology and chemotherapy, let's get back to the lambs. Many producers like to vaccinate lambs against various diseases soon after birth. Tetanus protection can be given by injection of antitoxin, and protection against enterotoxemia can be assured by giving *Cl. perfringens* type C & D antitoxin. If the lamb received colostrum from a ewe who had been given boosters against these diseases, that additional protection should not be needed. Vaccination with *Cl. perfringens* toxoid or bacterin can be safely put off until the lambs are three months old—if the ewes were given boosters, and the lamb received adequate colostrum.

If your flock has immunity to soremouth, then the lambs will also have protection against that virus from their mother's colostrum.

If a lamb received no colostrum at birth, it should at least be given an injection of antitoxin against *Cl. perfringens* type C, and probably *Cl. tetani* as well.

We have vaccinated lambs at birth against the parainfluenza-3 or PI-3 virus, using nasal vaccine on a trial basis as recommended by a number of veterinarians. This virus can cause an infection of the windpipe (trachea) that leaves the lamb without some physical defenses against invasion of the lungs by other infectious agents that can cause pneumonia. There have been no controlled trials with sheep and lambs, and there is no proof that the PI-3 vaccine does any good at all, but clinical experience by vets who work with lambs a lot looks promising. The first year we tried it we had a greatly reduced incidence of pneumonia as compared to previous years. This proves nothing, because every year is different from every other, but we continued to use it until we felt that ewe immunity was adequate. The nasal vaccines are not approved for sheep, and therefore the package gives no instructions for use with lambs. Two well-known sheep vets recommend 0.5 cc up one nostril at birth, and that is what we used.

The PI-3 nasal vaccine (Naselgen, Aeromune) is combined with a vaccine against IBR (infectious bovine rhinotracheitis), which is not at all common in sheep, but a little extra immunity won't hurt. Ideally, all lambs should be given a follow-up treatment in four to six weeks.

Selenium and Vitamin E

If white-muscle disease has been a problem in your flock in the past, lambs can be given an injection of a commercial selenium–vitamin E mixture that you can obtain from your veterinarian. This mixture was developed for the selenium-deficient Pacific Northwest. It does not contain enough vitamin E for some areas of the country that may have sufficient selenium or a modest deficiency but that have vitamin E deficiencies in feedstuffs for some other reason. In informal clinical trials, G. E. Kennedy, a vet from Pipestone, Minnesota, has found that giving additional vitamin E is helpful to prevent white-muscle disease in that area. Dr. Kennedy sells some products by mail order that may be useful for white-muscle treatment. See Pipestone Veterinary Clinic in appendix 6.

Iron

According to many “experts,” sheep and lambs have no need for supplemental iron in their diet. Some formal studies in Canada and some barnyard experiments suggest that iron supplementation is very helpful indeed. We had always had a problem with lambs eating dirt when they got access to the barnyard. The dirt eating caused constipation problems, and finally one year a lamb died from the constipation. I cut it open after it died and found that its true stomach (the abomasum) contained a large handful of dirt, firmly packed. It had died of starvation because no food could pass this dirt plug. I suspected that iron deficiency might be a contributing cause of the appetite for dirt. We immediately gave the entire lamb flock injections of iron dextran at a rate of 1 cc per lamb, and the dirt eating ceased abruptly. The fact that providing iron stopped the dirt eating does not prove that an iron deficiency existed, but to be pragmatic, if you observe dirt eating you might want to consider trying the injectable iron compounds used for piglets. Ewe milk contains virtually no iron at all, so a lamb that is not eating any solid food has no dietary iron source.

Entropion

Some lambs are born with an eyelid turned into the eyeball. This condition, called entropion, causes lots of irritation of the eyeball from the lashes rubbing against it. Left alone, a few cases will take care of themselves, but most will require some sort of treatment. Treatment can be as simple as rolling out the eyelid a few times, after which it may stay out. If that fails, try to dry off the lid and surrounding area enough to get some adhesive tape to stick and tape the lid out. If the eyeball is irritated, apply some ophthalmic ointment to

soothe it or use a mastitis ointment of the type intended for injection into cow's teats.

If these simple solutions don't work, you can take a surgical route. Many veterinarians repair the condition by removing an elliptical piece of tissue from the lid and sewing the edges back together to shorten the eyelid and keep it away from the eyeball. Check with your vet on the price for this surgery, because it may be a bit high in relation to the value of the lamb.

A surgical technique used by many producers is to nick the eyelid with a scalpel or razor blade, making one or two short cuts in the lid, parallel to the edge. These nicks should not go through the lid but just cut the outside. On healing, the tissues shrink at the cuts and hold the eyelid taut and out of the eye. Either along with the nicking, or as a separate treatment, a single stitch, using a needle and thread, can also be made to hold the eyelid away from the eyeball. Metal surgical clips can also be used.

The method we prefer was invented by veterinarian Robert G. Stewart of Burbank, Illinois. He felt that the surgical procedures were too complicated, so he developed a nonsurgical technique that anyone can use. First, the eyelid is injected with an antibiotic preparation to inflate it and to pull the inverted edge away from the eyeball. Second, the eyeball is treated with a topical application of antibiotic.

Stewart first used oil-based, long-acting penicillin to inflate the lid. This worked fine, but the product has been discontinued by the manufacturer. Stewart suggests substituting an oil-based teat infusion, available from veterinarians, called Quartermaster. Either transfer the material to a sterile bottle or draw it straight from the infusion syringe by means of a hypodermic needle. To inflate the lid, use a short, fine needle such as a half-inch, 20- or 22-gauge. Hold the lamb's head firmly and insert the needle just under the skin of the lid, about three-sixteenths of an inch from the edge of the lid. Inject about 1 cc of the antibiotic. If you are nervous about injecting an eyelid, get your vet to show you how. It is a good trick to know for pinkeye treatments too. Dr. Stewart does not recommend the use of presently available long-acting penicillins because he feels that they may be too irritating. However, I have used a long-acting penicillin without any apparent irritation.

In the second step, the eyeball should be treated with an antibiotic ointment of some sort that can even be the same medication that was injected into the eyelid. Note that this is a topical treatment and is not injected into the eyeball.

OBSERVATIONS

The shepherd should be alert for various problems both ewes and lambs may have around lambing time. Make frequent checks of the drop band, the ewes and lambs in jugs, and those that are already out of the barn. Time spent in checking will be rewarded with fewer troubles that get out of hand.

The only way a shepherd can expect to spot a ewe having trouble in lambing is to have watched a lot of ewes who did not have trouble. If normal behavior isn't known, then one who needs help won't be spotted. If you are brand new to sheep, try to spend some time with an experienced shepherd at lambing before you are on your own. Alternatively, get on good terms with a sheep raiser whom you can talk to over the phone about things you don't understand. Even without any help or experience, just use common sense, observe a lot, and you'll get along. You'll make mistakes, but you'll learn.

In a perfect world, all lambs are born active and ready to go. After a few minutes of rest they'll be up looking for the teat and ready to get on with life. Many lambs will do just that, especially crossbreeds with a little Finn in them, though some are just not ready to get going. If you are there, and you should be, a weak or slow lamb can be given a meal of colostrum by a bottle nipple or with a stomach feeder. In fact, it is a good idea to give each of a set of triplets, or even twins, a bottle meal just to get them used to what a rubber nipple is in case they have to be supplemented or be transferred to a self-feeder for some reason. If a lamb knows only the real thing, it will view a rubber substitute with great disdain.

If you weren't there at the birth, you won't know whether or not the lamb got a meal from mom. Observe the lamb, and you'll probably catch it nursing. If it doesn't seem to be nursing, watch out. If it won't rise or if it stands humped up, perhaps shivering, it may not have had its first meal. Remember to stick a finger in its mouth. If the mouth feels cold to the touch, the lamb needs a meal of colostrum and should be fed in some way.

Sometimes lambs will act as if they had stiffness in the hindquarters and they may cry out. There are many possible causes for this, but don't overlook ordinary constipation. Lambs are born with some feces ready to be expelled, and in fact you will see some births in which the fluids and the lambs themselves are dotted with dark brown pieces of feces that were expelled when the lamb was still in the mother. This first dung, usually a dark brown to black,

tarry material (called the meconium) must be gotten rid of within the first hours after birth. Retained meconium causes the bowel and intestine to fill with gas—a condition called rattle belly in Britain, where it is common in some areas, because the lamb makes a rattling sound when picked up. Another symptom is “watery mouth,” which is just what it sounds like. If the meconium has not passed, an enema of soapy water or an oral dose of a teaspoonful or so of mineral oil will alleviate the condition. If you see mustard yellow to orange feces, the meconium has already passed, and all is well.

Diarrhea (scours) in very young lambs is rare, but not unknown. The sticky yellow feces is normal, but if it is loose and runny it is probably that nasty anerobe *Clostridium perfringens* growing in the gut, producing toxins and irritation. A single oral dose of soluble Terramycin given with the little rubber-bulbed dropper that comes in the package will generally clear up these very early scours. Others may prefer other drugs, but you’ll find that tetracyclines of some type are the favorites.

Be on the lookout for injured lambs. Ewes sometimes get overenthusiastic in the cleanup procedures and chew off tails or ears, or they may paw at the lambs so much in an attempt to make them get on their feet that they will injure them. Some ewes, especially first-time mothers, may reject one or more lambs and injure them by hitting them with a head or nose. These ewes are best tied, or the lambs given a hiding place in a corner. Some ewes are just plain oafs and will sit on a lamb and injure it or even kill it. For these cases, you should use a larger lambing jug—a klutz jug as we call it—to give the lambs a chance to escape being flattened by their mother. Alternatively, they too can be given a hiding place in a corner.

Keep your eye on the ewe for the first day or so. She should pass the placenta within the first twelve hours or so after lambing. If she doesn’t, you might want to consult your vet, because retained placentas can cause serious infections. Most ewes birth the placenta with no trouble at all.

Check the ewe’s bag at birth and after. A normal ewe will have a full, yet pliable, bag that produces a good supply of milk. If the bag is really swollen, and full of milk, use this opportunity to steal a little colostrum for reserve and relieve the pressure at the same time.

If the ewe has insufficient milk, give her lots of water and good feed, and supplement her youngster’s diet with some colostrum you stole from an overachiever. Try oxytocin to help her let down, although a dairy farmer would

tell you to get down on your knees and massage her bag with a warm towel to help get things going. Once she starts to produce, don't supplement the lamb's food, because she needs frequent sucking to stimulate her own milk production.

Watch heat lamps carefully. They are mostly made very cheaply and are ready to fall apart at the drop of a hat. Be sure to maintain them so there are no frayed wires or loose sockets. Never hang them by the electric cord, but use a wire or chain on the loop attached for hanging. Heat lamps will warm lambs, but they also set fires, burn lambs and ewes, and can electrocute both sheep and shepherd. We used to have a black ewe who expressed her opinion of heat lamps in a way that allowed for no misunderstandings. Every time we put a heat lamp in the jug with her and her lambs she would eye it for a brief moment, then smash it to rubbish with her head. She knew.

RECORDS

Lambing is the time to start keeping records for each ewe and her lambs, if you haven't started already. The records will be used for a couple of important purposes. For one thing, they are necessary for evaluating the performance of the ewe so that she can be compared to her flock mates if your long-range goal is to keep only the most productive ewes and cull the rest. The records should include the identity of the sire as well, because he is half to credit (or blame, as the case may be). The records are also important to show both genetic heritage and individual performance of lambs to judge their suitability as replacements in your flock or to sell to others as breeding stock.

A ewe is valuable to the flock if she produces a lot of pounds of lambs in a given breeding-lambing cycle. Productivity means first of all that she must come into heat easily, settle on first breeding, remain healthy during gestation, and produce live lambs with little or no assistance from the shepherd. This paragon of ewes should then milk heavily to grow out her lambs rapidly.

The ewe's heat cycles are easily checked if crayons were used at breeding and should be part of the record. Her ease of lambing should also be recorded. A few difficult births are tolerable with a small flock, and one might even welcome some problems as training for a novice shepherd. However, a shepherd who is trying to lamb out three hundred ewes in two weeks is going

to have little time to spare with tough births and should cull the ewes with problems.

Once the lambs are born, the ideal ewe should give lots of milk freely. She should accept her lambs eagerly and be an attentive, loving mother. Ewes who milk poorly or late, ignore their lambs, or even refuse to accept them or let them nurse, are not worth very much.

The real test of a ewe is how the lambs grow. Lambs should be weighed at birth, again in about three to four weeks, and again at some arbitrary time such as 60, 90, or 120 days; 90 days is a handy time to weigh and also give vaccinations.

Get all of the numbers together, go over them without emotion, and see which ewes are the best. Better yet, turn the decision making over to a hard-hearted computer so you can't let your likes and dislikes influence you. I predict that the cold facts will surprise you.

Put down dates of vaccinations of lambs, any treatments that were given, when ear tags were put in, tails docked, males castrated. Put down everything you can think of, because you never know when you might need the information.

Good records are priceless, so start them now and do them right. You'll be glad you did later for your own information. Also, you'll be pleased how impressed potential buyers of breeding stock are when they see complete records. Selling breeding stock really pays the bills.

EVALUATION

Lambing is a time when a lot of evaluation gets done naturally. A ewe who freshens with mastitis is a candidate for the truck, as are the poor mothers or the ones who are such good mothers that they kill other lambs to protect their own. This is also a period when you will be spending a lot of time looking at the sheep, so you will notice a lot of things that might slip by you in other parts of the cycle. No amount of advice from shepherds, veterinarians, magazines, or books can substitute for what the ewes will teach you if you just watch the flock and learn. If you spend a lot of time watching the ewes, one day you'll suddenly find to your pleasure that you can almost instinctively spot a ewe who is going to lamb in the next hour or so. The ewes give all sorts of indications, and it is just a matter of your learning to read the signs.

I know that it was great fun for me when I finally reached the stage in ewe watching where I was confident of my guesses at when they would deliver. I don't think it will ever cease to be pleasurable to be able to "read" a ewe, and recognize when she is ready, if she has any problems in store, and other signs that were a blank page to me for the first couple of years.