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# FLUSHING

The couple of weeks or so prior to breeding is the time to prepare ewes and rams for their job of manufacturing lambs. The ewes will have recuperated from lactation, and the rams will have idled away their time under a tree until they are ready to perform. If rebuilding was done right, the ewes and rams will come into flushing in fit condition, neither too thin nor too plump, but perhaps leaning a little to the slender side of the scale. Living things, from the tiniest microorganisms to complex higher forms, respond to the availability of nutrients in their environment by altering their reproductive rates. There is a natural feedback system in the biological world that regulates numbers according to their food supply. In the higher animals, low levels of nutrition are reflected in a low sperm count and libido in males, and low rates of ovulation and a reduced number of heat or estrus periods in females. Conversely, all of these increase when food is abundant.

Flushing is an old shepherd's term for increasing the feed to the flock in order to get them ready for breeding. The idea is to put the sheep on a rising nutritional plane in hopes of causing more ova to be shed at each heat and

starting the estrus cycles sooner. It is a matter of making the ewes' insides think that good times are coming.

Flushing is most effective with slender, older ewes (two-year-olds and older) during the early or late parts of the normal fall breeding season. It has less effect on lambs and yearlings and in the middle of the usual breeding season. Also, a flock that is already in adequate condition may not benefit from flushing and may instead become too fat.

The rams should have been maintained on a pretty good diet because they build their sexual apparatus all summer, with maximum testicle size usually attained in July in the Northern Hemisphere. Just be sure they have had enough exercise to be fit and ready to go.

After a long period of relative quiet, the flushing stage is a time when the shepherd as well as the sheep begins to feel the oncoming excitement of the breeding season. A few ewes will start to cycle early and stand around bawling. The rams will begin to get off their duffs and look longingly through fences and gates at the ewes. The shepherd, who has been pretty relaxed during the building time, has a good feeling knowing that the pattern of breeding, gestation, and lambing is about to start again. After all the necessary nonsense of haying and taking care of crops, it is great fun to sit down and decide which ram to breed to which ewe. It's fun to get back to being a shepherd again.

## NUTRITION

At the outset, remember to change feed slowly when an alteration in diet is made. This is especially important when a change is made to a more concentrated feed, especially one rich in carbohydrate energy. An increase in a bulky feed such as hay won't cause much of a problem because it is relatively low in quickly digestible energy. A sudden boost in a high-energy food such as corn can create trouble.

### Rumen Changes

The thing to keep in mind is that the microorganism flora in the rumen of a sheep is a complex community made up of many different species and strains, each of which is adapted to a certain kind of food. When the ewe's diet is altered, the relative numbers of the various microorganisms are no

longer appropriate to the task of digestion. Some types will have to increase in number while others diminish. The whole character of the rumen population must change, and that takes time. The careful shepherd changes the diet by steps over a period of a week or so to get to the final high nutrition flushing fare.

Failure to allow for slow change can have highly adverse effects. A sudden increase in carbohydrates can cause a condition called lactic acidosis. Corn or other cereal grain is the usual cause, although wheat is even more dangerous, because it is so easily digested that fermentation in the rumen is very rapid. Wheat should never be more than half the grain fed, and generally less than that. Acidosis also can be engendered by green corn, potatoes, sugar beets or cane, forage turnips, cabbage family crops, fallen fruits, or a host of other culprits. The change from a high-roughage, low-energy diet such as pasture or hay to a low-roughage, high-energy one creates the problem. With the sudden availability of carbohydrates the starch-converting species increase in numbers very rapidly and dominate the rumen flora, producing lactic acid, but other microorganisms that utilize the lactic acid do not increase sufficiently rapidly to convert the lactic acid to a useful and harmless form.

Slow changes in feed prevent all of this. Some ewes, especially older ones, can get acidosis even with slow changes, especially if they are aggressive eaters. They will droop their ears, get diarrhea, and look very sick. Give them a drench of a couple tablespoons (up to a quarter cup) of baking soda (sodium bicarbonate) dissolved in a little water, and they'll snap right out of it. Some producers give mineral oil to empty the rumen and to slow absorption of the lactic acid. A turkey baster is handy for all of the above dosing.

If undigested carbohydrate passes from the stomachs into the intestine, it can cause a rapid increase in the numbers of the bacterium *Clostridium perfringens* type C, the same bacterium that causes some scours in very young lambs. *Cl. perfringens* ferments sugars, producing gas and acid as well as a toxin that can kill the sheep. This disease is called "struck" in England, and is supposedly rare in North America, though we had it in our flock before we started vaccinating against the type C variety. It mostly affects yearlings and two-year-olds. If the intestine has not been damaged beyond repair, affected animals can be saved by injections of large amounts (10 to 40 cc) of appropriate antitoxin. The best approach is preventive: vaccination and slow feed changes.

## Legumes

As long as the changes are made relatively slowly, almost any feed can be used for flushing. There is one feed to avoid, however, and that is clover, especially red clover: clover and some of the other legumes, such as alfalfa, contain phytoestrogens—chemical compounds that can inhibit estrus and ovulation. A ewe fed large amounts of red clover won't come into heat at all, so if you feed red clover, do it at some time other than flushing or breeding.

No pasture is 100 percent red clover, of course. Brian Magee at Cornell suggests a bioassay of the pasture using wethers. Check the wether's teat length, then turn them out on suspect pasture for two to three weeks. Remove them and monitor teat length for a week or two. If it more than doubles there is lots of phytoestrogen present, and one should keep ewes for breeding off that pasture.

One could, at least theoretically, feed red clover intentionally to hold off estrus until desired. I have not tried this, so I can't tell you how long the birth-control effect persists after the clover is withdrawn, but it might be a good way to crudely synchronize cycling of a ewe flock.

Other legumes do not seem to cause estrus problems. We have fed alfalfa hay through flushing with no ill effects, and even ewes flushed on standing birdsfoot trefoil have come into heat while eating it. I suppose to be on the safe side one could feed a nonlegume hay at this time if it was available.

## Flushing on Pastures and Crops

By far the simplest flushing procedure is to turn the ewes into lush pasture if it is available. They will thrive and be ready for the rams. If seasonal or other considerations make ordinary pastures unsuitable, then the flock can be flushed on crops planted especially for the purpose.

Rape, a primitive cabbage, is a common flushing crop that is usually planted as a companion to oats, barley, or other small grain. The rape grows slowly under the canopy of stems and grain heads, then takes off rapidly after the grain is harvested.

Forage turnips, including the forage turnip  $\times$  Chinese cabbage cross, Tyfon, can be planted in the same way to give a late summer or fall crop for grazing. If cheap seed can be located, any member of the cole (cabbage) family can be planted. The southern "green," collards, produces large quantities of palatable forage in any climate, or kale might be considered for the north because of its remarkable frost resistance. Choose your kale carefully, because

some varieties in quantity are poisonous to sheep. Sheep feeding on any cole family plants should have access to iodized salt in their salt/mineral mix because the coles contain compounds that inhibit thyroid function and can produce goiter if sufficient iodine is not available.

Rather than planting a flushing crop as a companion to small grain, some shepherds plant a field or two especially for flushing. A good way is to mix a variety of seeds and dump them all into a seed drill and plant without even tilling the field first. The drill will get the seeds into the ground if it is moist enough, although you may till the field lightly if you wish. Try mixing oats, barley, wheat, millet, corn, rape, peas, soybeans, or any other similar seed you might have. A mixture of plants in such a planted pasture gives the sheep a rich variety of excellent nutrition, generally better than any the plants could provide separately because of their different root depths and the variations in the composition of their tissues. Because flushing is commonly a fall activity, it is wise to avoid sorghum and other plants that can cause hydrocyanic acid (prussic acid) poisoning if stressed by drought or frost.

Another possibility is to plant a fast-growing crop like Tyfon into crop residues such as stubble from corn or small grains. The Tyfon will be ready to graze about seven weeks from planting. Straw should not be tilled in, as it would use up nitrogen in decomposing, and Tyfon and other turniplike plants are big nitrogen consumers. A sheep-raising friend in Pennsylvania, Jim Barlow, seeds Tyfon after harvesting a sweet corn crop and uses it for fall grazing. Tyfon can also be sown by air about two weeks before grain harvest to give it a head start. The suppliers of Tyfon, Great Western Seed Company, P.O. Box 387, Albany, Oregon 97321, recommend sowing about five pounds to the acre, or a bit more if by air. Seed is also available from Lehle Seeds, 1102 S. Industrial Blvd., Round Rock, Texas 78681, sales@arabidopsis.com, www.arabidopsis.com/.

Common purple-top turnips and forage turnips also make a fine flushing crop. A planting of two to three pounds to the acre gives nice big roots as well as tops. Both turnips and Tyfon require about 100 pounds of nitrogen to the acre. Turnips don't compete well with weeds and are best planted following a clean crop. They are ready for grazing after about ninety days and are best suited to regions of mild winters where they won't get caught in frozen ground. Small roots of either Tyfon or turnips can lodge in sheep's feet, so be alert for that, especially in muddy ground. With a good crop of either plant you can expect to be able to graze about 180 sheep for two weeks on one acre.

An advantage of turnips over Tyfon is that they will store themselves, as it were, until the sheep are ready. Tyfon, on the other hand, should be grazed immediately on maturity, and it will grow back quickly if your climate allows it. Sheep have been known to refuse drought-stressed Tyfon, a fact you might consider if dry growing seasons are common in your area.

Trials of brassica forage crops in 1981 by Frank Schwulst at the Colby, Kansas, Agriculture Experiment Station resulted in the following grazing days per acre: turnips, 2,300; turnip rape, 3,400; fora rape, 3,400; and Tyfon, 2,400. Fora rape is a forage rape variety that grows as high as three feet and is thus quite resistant to loss by trampling, unlike some related crops. Other possibilities in the same broad group of plants include rutabagas and large radishes. The giant Japanese radishes, or daikon, would be an interesting possibility to try if an inexpensive source of seed could be located. I suppose the sheep would burp a lot though. For seed of any of the above try Advanta Seeds Pacific in Albany, Oregon, 800-288-7333 or White Lake, Wisconsin, 800-359-2480; Albert Lea Seed House, Albert Lea, Minnesota, 800-728-8450; Barenbrug USA, 302080 Old Highway 34, P.O. Box 239, Tangent, Oregon 97389, 541-926-5801 or 800-547-4101; and Welter Seed and Honey, Onslow, Iowa, 800-728-8450.

Some sorts of crop residues are suitable for flushing provided they are not just roughage such as corn stalks. Sugar beet tops are excellent, provided the sheep learn not to choke on them. Corn, pea, and bean residues make good feed if there is enough lost grain and not just stems; the same comment applies to small grain leavings. If the combine didn't get everything, and they never do, sheep will do a dandy cleanup job. If spilled grain is abundant, the sheep should be allowed access for only a short time each day—as little as ten or fifteen minutes—so they do not overeat (with the distressing results discussed earlier). In southern areas sugarcane stubble can be used.

Green chopped crops make good flushing feed too, with corn being especially good if it is chopped before maturity. With green chop the shepherd can go out each day and chop just enough for one feeding at a time. Sugarcane and alfalfa grass mixtures can be used in the same way, or a field of peas can be planted for chopping. Straight green chopped alfalfa can cause bloat, so caution is advised.

## Unusual Feeds

In coastal areas don't overlook seaweed as a source of sheep feed. Feeder lambs are bought in Britain and fattened on French beaches to provide a supposedly

particularly tasty product for Paris gourmets. It would be difficult to graze sheep on many U.S. beaches, but one could harvest large quantities of the giant algae with a dump rake and a loader at little cost. Sheep raisers near the coast should have some of the local seaweed analyzed for feed value or feed some on a trial basis. Shepherds near coastal government or military installations with long stretches of fenced-off beach should look into acquisition of grazing rights. You could become the only shepherd in the area who had to get a security clearance to graze your sheep. What the sand does to the sheep's teeth I have no idea.

In some areas you might be able to graze your sheep to control weeds in crops fields or to reduce noxious plants in grazing land. New Zealand farmers use sheep as four-legged herbicides to clean up fields as a normal part of the crop cycle. There are experiments with using sheep to rid grazing land of leafy spurge, poisonous to cattle but harmless and nutritious to sheep. Sheep are being used to rid city parks of kudzu in one Florida city.

In some areas spent grain from the fermentation process may be available from breweries, distilleries, or fuel alcohol production plants. Such grain is low in energy and is wet and heavy. Brewer's yeast could be available from the same sources. Either would have to be supplemented with a roughage and energy source, though the waste products themselves are very high in protein.

For energy sources to go along with high-protein feeds, use your imagination. Can you find a supplier of reject or spoiled fruit? Just be sure it hasn't reached the fermentation point, or you might have a bunch of woolly drunks to take care of. Do you live near a plant that processes potatoes? The peelings and odd bits left from making French fries are a fine energy source. Both fruit and potatoes are high in water content, so dry roughage would have to be fed along with them to head off diarrhea. Stale bakery goods are commonly a cheap source of dry, high energy feed and are available in huge quantities from large bakeries. Beware of feeding too much of the bakery goods, because they are very easily fermented in the rumen and acidosis can result; however, together with hay they are just fine (see Rumen Changes a few pages back).

Don't overlook leaves as sheep feed. Sheep raiser Gary Jones of Peabody, Kansas, fed leaves as the sole feed to his flock when a drought made hay scarce one year. He reports that leaves from osage orange tested almost as well nutritionally as high-quality alfalfa hay. He put a classified ad in a local paper that offered cash for bags of leaves delivered to his farm and was practically

buried in the huge pile of leaf-filled garbage bags that suddenly materialized. A combination of leaves and grain might make just the flushing diet for your flock.

The commonest flushing fare is grain, especially corn, fed along with hay or pasture. Any grain can be used, of course, and you should let local prices and availability be your guide. We generally feed a pound of corn and three to four pounds of hay per ewe. Unless your hay is straight alfalfa, which is high in calcium, add some limestone to the grain at the rate of 1 to 1.5 percent (twenty to thirty pounds per ton) to balance the phosphorus in the grain. Limestone can also be added to a salt mix.

Be sure the ewes have plenty of water available. On reduced water, sheep will voluntarily limit their feed intake, and you want them to eat well. Make salt available to them to encourage water drinking. Most authorities recommend mixing about one half dicalcium phosphate with the salt or using a commercial sheep mineral mix. The latter is much more expensive.

Whatever the feed, be sure that it is one on which the ewes will gain. Use the NRC tables or try some feed computer software, then get out there and feel a few backs to see if they are gaining weight. Remember also that overly fat ewes will have low fertility and should not be put on a gaining diet at all.

For flushing, the environment can be a forty-acre field or a small feedlot. If you have no need to observe the ewes closely it doesn't really matter. We like to check on our ewes frequently during flushing, and we feed them their grain in a small, confined area so we can examine them with minimum difficulty.

It is also helpful to move the sheep around a bit to get them used to being herded again if they have been loose on pasture for some time. Feeding grain is a great training aid to reacquaint them with the concept of coming on call. They quickly learn to respond to a call of "Sheep!" or "Oh-oh-ovie!" when they are rewarded with some tasty corn or oats.

## PREBREEDING ACTIVITY

### Teasing

Flushing is the time to start teasing if your management scheme includes this practice. Teasing is placing a sterilized ram with the ewes to aid in bringing them into heat but not getting them pregnant. The teaser is commonly fitted

with a marking harness and crayon so the time of heat of each ewe can be noted from the crayon mark left on her rump by the teaser mounting her.

The idea behind teasing, apart from indicating the time a ewe is in heat, is that ewes produce fewer ova on the first heat than on subsequent ones, and more ova mean more twins and triplets. The sterile teaser ram brings the ewe into heat and marks her. The marked ewes can then be put with a fertile ram on the next or later heat cycle for breeding. We have found that our lambing percentage is greatly increased by teasing, and I recommend it highly to any producer who wants more lambs. We do not tease ewes being bred as lambs because we try to keep the number of multiple births from lambs at a minimum.

The teaser can also be a fertile ram wearing a harness, called a Ram Tam, that prevents him from entering the ewe. We have not used those harnesses on any of our rams, so I have no firsthand experience to report, but one does wonder about their cleanliness and the effect on the ram's libido. Another method is to put a ram in a pen or pasture next to the ewes so that he can be smelled by them but cannot get at them to breed them. This method is not always satisfactory because the ram may jump the fence or break through a gate or panel to get with the ewes—or even breed them through the fence.

Yet another method is to use a cryptorchid ram. Cryptorchism refers to the testicles' remaining in the body cavity instead of descending into the scrotum where they belong in a normal ram. This condition can be artificially created by pushing the testicles up into the body of a ram lamb and placing an Elastator band where the empty scrotum attaches to the abdomen (as described in the castration section of the chapter on lambing). The crypt ram has all the normal hormones of an entire ram, but the sperm are killed or weakened by the high temperatures in the body cavity, so that theoretically the ram can tease the ewes without getting them pregnant. The only problem with cryptorchids is that they are not always completely sterile.

The most satisfactory method is to have one or more rams vasectomized. The veterinarian removes a section of each of the tubes that carry the sperm from the testicles (the vas deferens) and ties off the free ends. Sperm are then confined to the testicles and resorbed. The ram is a male in every respect except that his semen contains no sperm. Be sure that the vet doing the surgery removes a section of each vas. We had one vasectomy done in which the veterinarian merely tied the vas tubes. This worked the first year, but then the ram became fertile again somehow and bred almost the whole flock the next year when we thought we were using him as a teaser—disaster! In addition,

be sure to have the vasectomy done sufficiently ahead of time so that sperm in storage weaken and die before the teaser is placed with the ewes. We have found that two months is long enough.

The teaser can be equipped in some way to mark the ewe when he mounts her. A harness that holds a marking crayon is the usual device. The awkwardness of a marking harness is another reason why I don't favor the use of yet another harness to prevent entry into the ewe. With all those straps and buckles, the ram looks like a sky diver who has lost his airplane. He might feel less interested in sex than in getting rid of his encumbrances. (See more about types of crayons and the like in the chapter on breeding.) You can also smear paint or grease every day over the ram's brisket, with which he marks the ewes. When a ewe is placed with a fertile ram, he can wear a different color crayon or paint so that the actual breeding date can be noted. Heat periods should be about fourteen to nineteen days apart, depending on the breed of the ewe, with sixteen days usual for most breeds. The shepherd should check the ewes daily for marks: another good reason for feeding in a confined area so the spookier ones can be examined almost as easily as the laid-back ones.

A teaser ram can also be used to advantage in management schemes attempting out-of-season breeding. Experiments at the University of Wisconsin have shown that the number of ewes coming into estrus out of regular season is increased by the continuous presence of a teaser ram, so a teaser can be useful more than just once a year. If you raise sheep partly for hand-spinner's wool, choose a ram with a valuable fleece, and he will pay his feed bill with wool alone. Otherwise, pick a lean, lanky fellow who won't eat too much, but who has lots of sex drive. Do remember, too, that the teaser may not be fertile, but he still has a ram's personality, so don't turn your back on him unless you enjoy bruises and broken bones, because many rams are aggressive by nature and will take any opportunity to butt the careless shepherd. Even seemingly tame rams will butt when the notion strikes them, and pets are often worse because they have little fear of people. I have had bruises and broken ribs from rams, and one of them put Teresa in bed for a couple of days, so don't take chances.

## Handling

Even if your ewes are being flushed on pasture, you will still have to handle them a bit. The main thing to do is to shear both the ewes and rams, at least partially. The ewes can have the wool trimmed off around their vulva, or

“crutched,” to give the rams a clear shot as well as to give the shepherd a clear view to observe early signs of heat. For long-wooled sheep it can also be helpful to shear over the rump to provide a place that will show the crayon mark clearly. Some crayons don’t mark well on long wool, especially in cool and wet conditions. The rams should have their bellies sheared, and in warm weather the wool clipped off their scrotums as well. You may prefer to shear them completely, especially if you do breeding in warm weather. Consider shearing any long-wooled breeds completely at this time too. With Lincolns, Cotswolds, and their crosses the wool is so long in a full year that the fleece can be lost to tangling and coting of the ends. With these breeds a six-month fleece is long enough for most purposes.

If estrus synchronization is practiced, you should insert vaginal sponges or pessaries at this time. I’ll discuss synchronization at greater length in chapter 3 but the idea is that chemicals in the sponges or pessaries keep the ewes from estrus as long as they are in place. They would be removed prior to placing a teaser ram with the ewes, or when the ewe was placed with a breeding ram, if teasing is not used.

## Medical Care

During crutching of the ewes and shearing of the rams’ bellies and scrotums, the hooves should be checked and trimmed; look for any signs of hoof disease in the process. Be sure to trim the hooves enough, but try to avoid bleeding, especially of the rear feet.

Ewes have to bear the weight of the ram on them, and he must have sound feet too. To trim feet you will need a pair of what the catalogs called hoof rot shears. (This is, to my mind, a pretty negative attitude because well-trimmed hooves are less subject to infection.) I personally prefer tree-pruning shears.

If you look at a sheep’s hoof, you will see little growth ridges on the surface of the hoof. You should trim parallel to these growth lines. Trim off any ragged edges down to fresh hoof. Then trim the point of the hoof until the cut reaches the fresh hoof material that looks a little bit like a hunk of polyethylene plastic or paraffin. You may find it simpler to first cut a piece off the tip. You will not have to trim much off the heel unless it is rolled under badly. When you get close to making the hoof bleed, you will be able to see blood faintly through the translucent material of the sole of the hoof.

For trimming, I dump the sheep as for shearing, and with it controlled between my knees, I trim the back hooves first, then the front ones, so a freshly



*Hoof trimming: side view of hoof before trimming. Note the growth lines on the hoof.*



*Side view of hoof after trimming.*

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*Bottom view of untrimmed hoof with rolled-under edges.*



*Bottom view of hoof after trimming.*

sharpened front hoof can't cut me while I'm trimming the rear ones. Some people prefer to tether the sheep to a post at the corner of a pen using a halter, then lift the hooves one at a time to trim them, holding the sheep against the side of the pen with legs and hip. Some sheep will stand docilely for such trimming.

You should not have to trim hooves more than twice a year if sheep are out on rocky or sandy pasture most of the time. Individuals that require more frequent trimming are candidates for getting out of the flock.

Check and treat the ewe's vulva for any signs of infection or cuts. A ewe with a pink and swollen vulva may simply be in heat, but the shepherd should be sure that infection is not the cause. Presence of a clear, sticky discharge is normal for a ewe in estrus, but if the discharge is cloudy, dark, or malodorous, treatment should be given. Consult your vet for recommendations.

Be sure also to check the ram's penis sheath (the prepuce) for obvious sores or scabs, and if these are present, treat according to your veterinarian's advice. Examine each ram's testicles while he is in a standing position. A tenderness or swelling of the tube at the bottom of the testicle (the epididymis) is a possible sign of epididymitis. Have your vet confirm your diagnosis and cull the ram if he really has epididymitis because there is no effective treatment. It is caused by an infection with *Brucella ovis*, and can spread from ram to ram.

Disease prevention is always better than attempting a later cure. Breeding is a suitable time to vaccinate for a number of diseases of sheep, but especially for vibriosis. (Other diseases of local importance may be of concern, and nearby producers and veterinarians should be consulted.) Vibriosis used to be confined to the Rocky Mountain states, but is now found throughout the United States and Canada.

This disease is caused by a bacterium, *Vibrio fetus* var. *intestinalis*, and results in weak lambs, stillbirths, and abortions. The disease is transmitted from carrier ewes who show no clinical signs, or from aborted fetuses and associated tissues and fluids. Abortions usually occur during the last trimester of pregnancy and can affect large numbers of a flock in so-called abortion storms, with losses of up to three-fourths of the lambs. The bacteria live in the intestinal tract of carrier ewes between outbreaks. Prevention is by vaccination up to thirty days before breeding. The vaccine is not the same as the one for vibriosis in cattle. New stock or replacements should have been vaccinated twice when introduced to the flock and revaccinated at this time. It is commonly believed that once a flock is vaccinated against vibrio, the pro-

ducer is obligated to vaccinate every year because the vaccinated ewes become carriers of the disease. This is nonsense. A revaccination every few years, or even every year in endemic areas, is not out of order, however, because the disease can be transmitted by carrion-eating birds or by a pair of dirty boots.

Another abortion-causing organism is a chlamydia that causes enzootic abortion of ewes (EAE). Enzootic abortion was once confined to Idaho and a few other states, but with the transportation of sheep about the country, it is, like vibrio, now found throughout the country. Once again, vaccination is in order as a preventive measure. A combined enzootic abortion and vibriosis vaccine is available. There is no need to worry about EAE if it does not occur in the region where you live, but that's not likely.

If sore mouth is present in your flock, you might want to vaccinate the flock at this time. Sore mouth is caused by a virus that persists in soil and around barns. Sheep that have had sore mouth, either from an accidental infection or from vaccination, are not carriers, but scabs shed from their infection contain live viruses that can infect susceptible animals. If you have never had sore mouth on your farm, do not vaccinate, as this will introduce it. Your best bet is to do nothing until the disease appears.

If sore mouth is already present on your premises, you can give the ewes a vaccination now and perhaps a booster in late gestation to make them immune. The vaccine is a live virus in a powdered form that is mixed with a diluent to make a suspension that is applied with a brush. A place on the skin under a leg or in an ear is abraded (not enough to cause bleeding) with a tool supplied with the vaccine, and the vaccine brushed on with the bristles at the other end of the tool. Alternately, a bit of wool can be plucked from the breastbone of the sheep and the liquid applied there.

The sites can be checked in a week, and the ewes revaccinated if there was no "take," a condition indicated by the presence of a scab. Do not try to save the vaccine after rehydration because it loses effectiveness quickly. The vaccine is only about five to seven dollars for enough to vaccinate one hundred sheep or more, so don't be penny-wise. One precaution: the virus can affect humans and cause a disease called orf, so wear gloves and wash your hands thoroughly after using the vaccine.

When ewes overeat on grain there is always the problem of lactic acidosis (as mentioned earlier), but there can be a much more immediate health problem that is purely mechanical. An occasional ewe will eat so eagerly that she will get a mass of grain lodged in her esophagus that will block the passage of

air through the trachea to the lungs. The result is rapid death. Lightweight grains such as oats are especially bad in this regard because they can even be inhaled into the trachea itself. The symptom to watch for is a sheep coughing violently or trying to cough. It will try so hard that the spasm will lift its front feet off the ground, sometimes to the point that the sheep will fall over backward. The shepherd must act quickly. Have a short length of garden hose handy, one-half inch for adults and three-eighths of an inch for lambs, with the ends smoothed by a little sanding or filing. Lubricate the hose with a little mineral oil (or water if that's all you have) and ease it down the sheep's throat to try to clear the esophagus by pushing the plug of grain into the stomach. You may be able to feel the grain plug with your fingers from the outside of the throat and manipulate it from the outside as the hose moves along.

A physician friend of mine reminded me that the well-known Heimlich maneuver would be useful to dislodge a grain plug in the trachea or at the junction between the trachea and esophagus, and he pointed out that Dr. Heimlich first tried the technique on animals, including sheep. The idea of this technique is to cause a burst of air to be expelled from the lungs so as to dislodge the offending object. You will have to apply a sharp, forceful pressure to the soft part of the sheep's "stomach" between the navel and the rib cage, perhaps with fists or a knee, but don't get so violent that you injure the sheep with the treatment.

The only other observation that is really important at this time is to keep an eye on the ram to see that he is doing his job of teasing and is actually mounting the ewes. If he acts tired or has a limp, take him out for part of each day so he can get a rest from his vital chores.

## EVALUATION

The flushing period is your last chance to cull unproductive ewes, so don't delay. There is no sense feeding a ewe all through breeding and gestation if she is not going to give you lots of lambs.

This is also the time to think about which ewes should be bred to which rams in the interest of both long-term genetic changes in the flock and top lamb production. It is too late to change your mind once the ewe is bred by a fertile ram.

Flushing is also the time to make a judgment about ewe lambs if you intend to keep any of them as breeding stock. Each sheep raiser will have somewhat different specific criteria to use in judging a ewe lamb's suitability as a breeder, but some general rules apply to most situations. Poor gainers should be shipped when marketable because they will generally not prove to be productive ewes. They may well be slow growers because they do not eat enough, and that means they won't eat enough to be good milkers either. If a small lamb is a triplet or a quad, then the small size may be acceptable, provided you find it economical to hold her over for breeding as a yearling.

Ewes bred as lambs should weigh at least one hundred pounds when bred. If bred at lighter weights, they commonly will settle, but will produce poor lambs, give little milk, and probably will be permanently stunted by the premature breeding. The lambs that make the weight should be evaluated for body conformation, wool quality and type, and how well they fit a flock or breed standard. Big, healthy lambs that don't fit your flock for some reason should be sold as breeding stock if possible, because you'll get a better price for them than you would if you sold them as slaughter animals. You'll also be making quality breeders available to others.

One management technique is just to breed all the ewes that meet the minimum weight standard and then ship the ones that don't get pregnant. They can be pregnancy-checked as described in chapter 4 and the pregnant ones retained in the flock, adding their tendency for early sexual maturity to the flock gene pool. The open ones will still be young enough to go to market as lambs at a higher price than you'd get for them as yearlings, and you save the cost of several months' costly feed.

On the other hand, you may prefer to retain all suitable ewe lambs to be bred as yearlings. In times past, very few sheep raisers bred ewe lambs, and quite a few still adhere to that practice. The decision is up to the individual grower. You will encounter very strong opinions on both sides of the question, but it is fair to say that the current trend is toward breeding ewes as lambs.

The change in attitude can be attributed partly to economic considerations and partly to the breed composition of modern flocks. In times gone by, profit margins were more generous than now, and few farmers took the time to sit down and calculate expenses and income with a view to optimizing profit. Such a casual attitude is not permitted in today's markets, and a ewe's lifetime production is an important factor.

The question is partly whether the lifetime production of a ewe is increased or decreased by early breeding. The argument is made that premature breeding shortens the ewe's useful life and is hard on her. I personally don't know of any controlled experiments that test that theory, but it is a popular belief. There is considerable evidence from studies by agricultural scientists in Oregon, New Zealand, and Norway that the reverse is true.

It may well be that the prejudice against breeding lambs comes down to us from experience with some of the old breeds in the north of England and in Scotland. By a combination of breed types and scarce feed, the growth of ewe lambs there is sometimes so slow that they are not bred for the first time until they are two-year-olds. The same breeds might mature much earlier on better feed, although the old Scottish "herds" (shepherds) scoff at the downs breeds as turnip-eaters who wouldn't survive on the sparse fare of the Highlands. They may be right, too, because a Suffolk ram of ours grew thin over the summer in a rich pasture he shared with Lincoln, Finn  $\times$  Lincoln, and Lincoln cross rams who stayed fat and sassy.

Be that as it may, the turnip-eaters like the Suffolks do mature early, as do Finnsheep and their crosses, and if you still have rams and ewes mixed in your pens or lots of lambs, you may have already begun breeding without intending to do so.

One can argue from a biological basis that longlived species—such as elephants, tortoises, and, of course, man—tend to be slow in maturing. These slow maturers, among mammals at least, seldom produce multiple births. In contrast, rapidly maturing species like rabbits and rodents mature early, have frequent litters of offspring, and relatively short lifespans. Perhaps by selecting our flocks for rapid growth and early maturity as well as for prolificacy, we are also selecting for a short useful life. Certainly it is a fact that Finns have a shorter useful life than other major breeds, and it is a joke among Suffolk breeders that one nice thing about Suffolk rams is that people have to come back soon and buy new ones because they don't last very long.

Remember, if you do breed the ewe lambs, you probably should not tease them because teasing increases the likelihood of multiple births, and ewes lambing as yearlings may have problems with twins. Ewes bred as lambs commonly do not have enough space inside their immature bodies to hold more than one lamb by the last part of gestation, and they also will generally not produce enough milk to suckle more than one lamb adequately.