Sheep Production in South Dakota

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SHEEP Production
IN SOUTH DAKOTA

ANIMAL HUSBANDRY DEPARTMENT
Agricultural Experiment Station
South Dakota State College
BROOKINGS
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By Robert M. Jordan

Sheep production in South Dakota offers farmers an additional means of stabilizing their income and production. The two cash crops per year, wool and lambs, always have been popular. With the necessity of planting more grasses and legumes to conserve our land, the need of putting more emphasis on roughage-consuming animals is evident.

During World War II the sheep numbers in the United States declined about 40 percent from their high peak of 1942. However, since the United States produces only a fraction of the wool that this country consumes, and with sheep numbers likely to stay below the peak number attained in 1942 in the western part of the United States, the law of supply and demand appears to favor the man who maintains a band of ewes. Prices for lambs and wool are likely to be in a most favorable position in respect to other livestock commodities for some time. The number of sheep kept on South Dakota farms does not remain constant, but varies with economic and climatic conditions, the greatest number being maintained during drought and hard times.

Farm Flock Production

Wool and lamb production on the farm flock basis should be on such a scale as to contribute a substantial part of the farm income. If sheep are kept mainly as scavengers in small flocks of 10 or 15 head, they usually are more of a nuisance than a source of profit. On the other hand, farm flocks of 50 to 150 ewes are farm enterprises large enough to receive the care and feed they so rightly deserve.

Selection of Ewes

Sound Ewes: A ewe that is not sound in mouth and bag should not be selected as a breeding ewe, regardless of how cheaply she may be bought. A ewe must have a soft pliable udder with no hard lumps and with two medium-sized teats, if she is to be very productive.

The condition of the teeth of a ewe is more important than the age of the ewe.

Ewes with some loose or missing teeth have difficulty chewing roughages and, unless they are fed ground grain, become thin. If they do lamb, they seldom produce enough milk for the lamb to grow well, and the death loss of the lambs and ewes is usually high.

Many men, when first going into the sheep business, select the fat ewes from a band. This is a mistake as these ewes often are the ones that did a poor job of nursing their lambs, failed to raise lambs, or are non-breeders.

Whether you are buying ewes or making selection from your own flock, choose big, thrifty ewes that show evidence of having raised their lambs. Make certain that all the ewes are sound by feeling their udder and looking at their teeth.

Type of Ewes: In selecting ewes for farm flocks, general type and breed preference are important factors to consider. Breed preference is a matter of individual taste, although some breeds will re-

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Fig. 1. A good type crossbred ewe and her 14 pounds of wool.

turn greater profit than others. The mutton breeds, Hampshire, Suffolk, or Shropshire, long have been popular because of their ability to produce fat lambs weighing 80 to 85 pounds at 4 to 5 months of age. On the other hand, they shear light fleeces. Certain types of crossbred ewes and the Columbia or Corriedale, which more recently have found favor among farm flock producers, shear about 50 to 75 percent heavier fleeces, are equally prolific, and produce rapid-gain ing lambs. Their greatest drawback is that their lambs are seldom fat at weights of 80 to 90 pounds.

By maintaining a flock of heavy shearing ewes and crossing them with a mutton-type ram, increased profits may be realized. The ewe flock will average 12 to 14 pounds of high-quality wool per head, and the lambs will have satisfactory mutton type and be fat at about 90 pounds. Experiments have shown that about 10 to 20 percent increase in over-all production can be made by crossbreeding.2

Often it is more economical to buy crossbred ewes raised under range conditions than it is to raise them, as fat ewe lambs usually will sell for more as fat lambs than it costs to replace them with ewes of breeding age.

Experiments have shown that large roomy ewes are more productive than small ewes.3 For every pound a ewe weighs over the average, she will produce one-half pound more lamb per year. On the average, a 120-pound ewe will

Miller, K. P., and Dailey, D. L., A Study of Cross-breeding Sheep, North Central Experiment Station, University of Minnesota.

University of Minnesota Agricultural Experiment Station.
produce about 5 pounds more lamb per year than a 110-pound ewe. This is not necessarily true where feed is scarce.

Open-faced ewes, or ewes having no wool covering the eyes, are more productive and more easily handled than closed-faced, or wool-blind ewes. An open-faced ewe is more capable of finding better feed, is less restless, and spend more time actually eating than a closed-faced ewe. Consequently, the open-faced ewe milk's better and will produce more pounds of lamb. The United States Department of Agriculture found that ewes of this type will produce about 10 pounds more lamb per year than a ewe that is wool-blind. If ewes are wool-blind, the probability of obtaining additional weight on each lamb will make it very worthwhile to shear the wool off the ewes head.

Selection for ewes that shear heavy fleeces is necessary if maximum returns are to be obtained from farm flocks. If under conditions of adequate feed supply some ewes in a flock are able to produce 10 to 12 pounds of wool but others fail to produce such a large amount, it may be assumed that the difference is caused by factors other than feed. In such a flock, ewes that produce 8 pounds or less apparently have not the inherited ability to produce heavy fleeces and should be culled. There is as much variation in the ability of sheep to grow a large fleece as there is in the milk-producing ability of dairy cows, and selection can be effective in improving the average fleece weight in a flock.

In choosing ewe lambs for potential breeding ewes, select those with a dense fleece and long staple. Large-framed lambs of good mutton type at weaning time grow into big productive ewes that are able to nurse a pair of twins and shear a heavy fleece. The fact that they are of large size indicates that they have inherited the ability to grow rapidly and that their mothers produced sufficient milk to provide nourishment for this rapid development.

**Breeding Season**

In South Dakota the breeding season commences about the middle of September. The gestation period of a ewe is 145 to 150 days; thus, a ewe bred September 15 will lamb about February 10, and a ewe bred December 1 will lamb about April 25.

**Type of Ram:** Only rams of desirable type and pure breeding should be used. Since the ram affects the quality of each lamb born, the greatest improvement in the productivity of the flock can be made through the ram. Select a ram that has good size, but, at the same time, one that has good mutton conformation and a good fleece. A registered ram with a deep body, wide back and loin, and a full leg of mutton is more likely to sire lambs that will have the desired blocky type and will weigh 80 to 90 pounds when fat, than a narrow, shallow-bodied ram of nondescript breeding. Improvements in fleece weights of the ewe band through breeding can be made three times as fast through the use of a good ram as can be done by culling the ewe flock, since more rigorous culling may be practiced on the rams than is possible upon the ewes.4

**Age of Ram:** Big, growthy ram lambs can serve 20 to 30 ewes. It is important that 1 pound of grain per day be fed a ram lamb during the breeding season if he is to be used for breeding as a lamb. A well-grown yearling in moderate flesh can serve 40 to 60 ewes. Extra feed for the ram during the breeding season usually results in a larger lamb crop and lambs of more uniform age.

4Terrill, Claire E., Range Sheep Improvement Through Selection. U. S. Sheep Experiment Station and Western Sheep Breeding Laboratory, Dubois, Idaho.
Trimming Ewe Preparatory to Breeding: All of the manure dung and stained wool should be trimmed from the dock and crotch of the ewe prior to the time the ram is turned in.

Flushing the Ewes: It is essential that the breeding ewes be in thrifty condition before the breeding starts. If the ewes are thin, most sheepmen practice flushing them just prior to breeding. This is done either by feeding the ewes one-half pound of grain a day or turning them onto a fresh pasture about two or three weeks before turning the ram out. This puts the ewe in a gaining condition, thus causing a healthy condition in the reproductive organs and an increase in the number of eggs or ova produced. However, there is not any advantage in flushing ewes if they are in good condition. There is some difference of opinion as to the value of flushing ewes, but most sheepmen feel that about 15 to 20 percent increase in lambs born can be obtained.

Marking the Ewes: To determine whether the ewes are being settled, it is advisable to paint the brisket of the ram just in front of the sheath. This will leave a paint mark on each ewe as she is bred. As ewes come in heat every 16 to 18 days, change the paint color on the ram after 16 to 18 days, and if many of the ewes are re-marked, it is good evidence that the ram is not fertile and a change of rams should be made. Red ochre, venetian red, lamp black, or other colored paint powders mixed with lubricating oil, which does not dry readily, have proved satisfactory for marking the ram.

Wintering the Ewe Flock

The cost of wintering the ewe flock is the largest single expenditure in producing lambs. If the wintering costs are too great, little profit can result, regardless of the lamb crop. On the other hand, if the ewes are wintered so cheaply that they are thin, unthrifty, and poor milkers,
production is apt to be so low that profits cannot result. Economical wintering with high production is essential for the maximum amount of profit.

**Feed Requirements:** The feed requirements depend largely on the condition and size of the ewe. The average-sized ewe requires 3 to 4 pounds of hay per day. Legume hays are excellent sheep feeds but usually are costly. Research conducted at the South Dakota Agricultural Experiment Station have shown that feeding one-third to one-half alfalfa and the balance native hay provided balanced rations, at 15 to 20 percent lower feed costs, and the ewes produced as well as ewes wintered on alfalfa hay.

If no legume hay is available, and grass hay or silage is the roughage fed, the ration can be balanced by feeding one-fourth to one-third pound of linseed meal or soybean meal. This ration will be equivalent in protein to one-third alfalfa and two-thirds brome ration and will prove satisfactory.

To maintain general thriftiness and assure a good milk flow when lambs are born, the ewes should gain 10 to 30 pounds during pregnancy. Feeding one-half pound of corn or one-half pound of a mixture of two-thirds corn and one-third oats, 3 to 4 weeks prior to lambing will provide the needed nutrients when the fetus is growing most rapidly, and will also help prevent pregnancy disease.

The winter feeding period in South Dakota is usually about 6 months. A supply of 500 to 600 pounds of alfalfa and 60 to 90 pounds of grain, or 200 to 300 pounds of alfalfa, 300 to 400 pounds of non-legume hay, and 60 to 90 pounds of grain will be sufficient feed to winter a ewe. The amount will vary according to the quality of hay, size and condition of ewe, and time of lambing. Ewes lambing in January and February will need considerably more grain than those lambing in April or May.

**Pregnancy Disease:** Pregnancy disease is often seen in ewes that are within 2 or 3 weeks of lambing. It affects only the ewes that are carrying twins or triplets. This disease is due to an upset metabolism, which is caused by improper and inadequate nutrition. Experiments at South Dakota Agricultural Experiment Station have shown that exercise has little bearing on whether the sheep will be afflicted with the disease. Ewes that are gaining in weight are seldom afflicted, but ewes that are in good condition and then have their feed cut down suddenly are very susceptible.

Ewes stricken with pregnancy disease will refuse feed, walk slowly and stiffly and grind their teeth. The death rate is usually high among ewes that are afflicted with this disease. If the disease is noticed in its early stages, a molasses or sugar and water drench will often correct the condition. One-half cup of sugar or molasses diluted in a quart of warm water and given three times a day is the usual dosage. As soon as the ewe will eat she should be fed one-half to 1 pound of grain until she lambs.

**Water and Minerals:** Sheep should not be made to rely on snow as their only source of water. Clean, fresh water should be available to the ewes at all times. Feeding iodized salt is a good precaution against goitrous lambs, and the difference in price between iodized salt and plain salt is too small to run the risk of having goitrous lambs. Salt block is unsatisfactory for sheep, as they have difficulty in getting enough salt when it is in that form. A mixture of 1 part flaked iodized salt and 1 part bone meal usually will supply all mineral required by sheep in South Dakota. Bone meal is particularly important if non-legume roughages or silage is being fed. This will assure an ample supply of calcium and phosphorus.
Suggested Rations for Wintering Bred Ewes

1. Alfalfa or other legume hay
   Non-legume hay (brome grass, western wheat, or other native hays)
   2.5 to 3.5 pounds

2. Alfalfa or other legume hay
   Silage
   1.5 to 2 pounds
   2 to 3 pounds

3. Non-legume hay (brome grass, western wheat, or other native hays)
   Linseed or soybean meal
   Calcium supplement
   .2 to .25 pounds
   .02 pound
   3 to 4 pounds
   6 to 8 pounds

4. Silage
   Linseed or soybean meal
   Calcium supplement
   .2 pound
   .02 pound

*One-half to three-fourths pound grain per head daily may be added the last 30 days of pregnancy.

Lambing Time

Lambing time is the sheepman’s busiest season. At no other time will indifference and carelessness affect his profits so greatly. Farm flock owners should strive at least for 125 percent lamb crop at weaning time. Obviously, such a lamb crop is impossible if every effort is not made to give every live lamb born a chance to survive.

Lambing Symptoms: It is extremely difficult to tell very long beforehand just when a ewe will lamb. Some ewes show more pronounced symptoms than others. Usually, they will refuse grain 2 to 4 hours before lambing. The vulva will be enlarged and swollen, the udder distended, and milk can be drawn from the teats. The ewe will sink away in front of the hips and drop away at each side of the rump. Nervousness, pawing the straw to make a bed, and leaving the band in order to be by herself are evident as the time of delivery approaches.

Normal Presentation: The normal presentation of lamb is head and front feet first, and little difficulty will be encountered if the lamb is in this position. When difficulty is encountered where the lamb is in a normal position, it usually is due to the head or shoulders being unable to pass through the pelvic arch. Help may be given by pulling on the lamb, outward and downward. If the attendant is on hand, there is no object in causing the ewe to labor for an hour or so when a little assistance from him will cause the lamb to be born in a few minutes. Thus, the ewe will not become tired and will be able to take care of her lamb that much sooner.

Abnormal Deliveries: At times it is impossible for the ewe to give birth to the lamb because of an abnormal presentation, and assistance must be given. Before entering the ewe, the operator should make sure that his fingernails are short and smooth and his hands are clean so as not to scratch or infect the ewe.

The lamb may have become twisted before birth and have its head back or front legs back. Sometimes all four legs will try to come through the pelvic arch at the same time. By raising the hind quarters of the ewe, so she is resting on her neck and shoulders, the lamb may be pushed back into the uterus for readjustment more easily. A book can be written on how to deliver lambs when they are
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in abnormal positions, but actual experience is the best teacher. Cleanliness, patience and gentleness are three essentials.

Helping the Lamb: An extreme adjustment must be made by the lamb after birth, and if an attendant is on hand, he should remove the membrane and mucus from the lamb’s nose and mouth. Vigorous rubbing and a slap or two will encourage the lamb to start breathing. Place the lamb near the ewe’s head so she can mother it and lick the mucus from it. Remove the plug or obstruction in the end of both of the ewe’s teats by milking out a little milk as a weak lamb often has difficulty in removing the plug. Since a lamb with milk in his stomach is able to stand more cold and will dry off twice as fast as an empty lamb, be sure the lamb sucks within an hour after birth. The ewe’s first milk contains colostrum which the lamb must have. Colostrum is laxative, high in vitamins (particularly Vitamin A) proteins, antibodies, and energy value, all of which are needed to get the lamb off to a good start.

Lambing Pen: After lambing, the ewe and her lambs should be placed in a separate pen that is warm and dry. Two panels hinged together at one end make an ideal arrangement for a pen and are easily stored. The panels are usually 30 to 36 inches high and 3 or 4 feet long, thus making a pen either 3 by 3, or 3 by 4, or 4 by 4 feet. A large-size pen should be used for large ewes. Ewes with lambs should remain in the pen from 1 to 3 days as this will help reduce the number of unclaimed lambs and gives the shepherd a better chance to see that both the ewes and the lambs are all right.

Feeding the Ewe after Lambing: Fresh water of about room temperature should be offered the ewe right after lambing as this helps to reduce the ewe’s fever. No grain should be given for 12 hours after lambing though hay may be offered right away. If the ewe appears to have an abundance of milk, keep grain from her as heavy grain feeding of the ewe may stimulate milk flow to such an extent that it will cause the lamb to scour and cause congestion in the ewe’s udder. However, if the ewe is thin and short of milk, start feeding her about one-half pound of grain a day and increase it up to 1½ to 2 pounds. Don’t expect a thin ewe to nurse a pair of lambs well if you don’t grain her.

Pinning: During the first 4 or 5 days the feces (droppings) from the lambs are sticky and often pin the tail to the body of the lamb, preventing further elimination. By pulling the tail up the accumulated feces may be removed.

Sore Eyes: Irritated eyes cause many blind and unthrifty lambs. The irritation usually is caused by some foreign material getting into the eyes or the eyelid rolling under. Five to ten percent arsphenamine, or a saturated solution of boric acid, will usually clear up the mild cases. In case an eyelid is turned under, tape the lid open with adhesive tape, or sew it back. It is also possible to take a tuck in the lid and tie it off with string. Apply arsphenamine after correcting the condition of the eyelid.

Orphan Lambs: Lambs that are disowned by their mothers, or lambs that are starving to death because the ewes do not have enough milk to care for them can cause the shepherd no end of trouble. However, if handled properly, they can be made to grow into profitable lambs. Ewes who lose their lambs should not be allowed to dry up, but some twin lamb or orphan lamb should be put on them. By placing the skin of the dead lamb on the orphan, the ewe will usually accept the lamb as her own. Leave the skin on a day or two. Smearing the ewe’s nose with distillate or rubbing the ewe’s after-
birth on the orphan lamb are other tricks that often work. If the ewe refuses to own her lamb, tie her up so she cannot bunt her lamb. The lamb will be able to nurse, and usually in a few days the ewe will give in and accept the lamb.

In cases where there is no orphan lamb available to give to a ewe who has lost her lamb, milk the ewe out and watch her carefully for several days to make certain her udder does not become congested. Such a condition often will spoil the ewe’s bag for subsequent lambs.

Docking and Castrating Lambs: Docking and castrating should be done when the lambs are between the ages of 1 and 3 weeks. If docked at that stage the young lambs suffer less from shock and the wounds heal faster. The tail may be cut off with a knife or sharp instrument, burned off with a hot chisel or pincher, or removed with an elastrator.

When lambs are docked with a knife, wounds heal faster and the lambs make faster gains than when the tails are burned off. However, some lambs may bleed to death. This can be minimized if the lambs are not excited before the operation and the tails are cut off when the lambs are only 5 to 10 days old. If lambs are docked during fly time, pine tar should be smeared on the tail stump to prevent maggots.

Fig. 3. Using an elastrator in docking a lamb.
Docking with a hot pinchers eliminates loss from bleeding and infections, but the sores are slow to heal and maggots may cause trouble 2 or 3 weeks after the tail has been cut off.

The system of docking lambs by tying a string or rubber band around the tail is an old one. However, the development of the elastrator has popularized this method and it is now being widely accepted. The elastrator is a type of plier that stretches a rubber band to facilitate slipping the band over the tail. When released the rubber band becomes taut around the tail, cutting off the bloodstream. It is rather painful to the lamb for 15 or 20 minutes, but eliminates bleeding. Atrophy takes place in a few days and the tail drops off in a period of 2 weeks or so. This same system may be used for castration.

In castrating with a knife, the lower third of the purse or scrotum is cut off and the testicles are removed one at a time by pulling the entire testicle out. The operator's hands and the knife should be clean, as infection is a constant danger. A diluted solution of creosote dip or lysol should be used as a disinfectant.

Both docking and castrating may be performed at the same time. Bright sunny weather should be chosen when the operations are performed.

Creep Feeding: In order to realize the greatest profits from lambs born in January, February, and March, a separate place where the lambs can go to feed should be provided. A wooden panel constructed to allow the lambs to enter and keep the ewes out should be available. The creep should be placed as close to the ewes as possible, otherwise the lambs will not go in to the creep as they prefer to stay close to their mothers. Young lambs receiving their mother's milk plus grain will make 100 pounds gain on about 125 to 150 pounds of grain and 100 to 125 pounds of roughage, whereas grown lambs require about three times that amount.

A mixture of 45 percent coarsely cracked corn, 45 percent oats, and 10 percent soybean oil meal makes a suitable feed for creep-fed lambs. Straight shelled corn and 10 percent soybean oil meal is satisfactory after the lambs are a month or two old.

It is neither profitable nor practical to creep feed lambs that are on good pasture.

Shearing and Wool Preparation

The average price of wool in South Dakota could be raised 2 to 5 cents per pound if the wool producers would give proper attention and care to the wool their sheep produce.

It is customary for dealers to buy wool on more or less an average price basis for a given territory. Average shrinkages are computed from past years, and with the knowledge of the price of scoured wool, the grease price for the area is determined. Yet it is known that the value of wool in a given territory may vary as much as 15 cents per pound in the grease.

However, dealers find that it is almost impossible to maintain a volume of wool coming in if they make a price differential as great as should be made in buying wool. Most people like to know about how much their wool is worth before they even bring it in for sale, and, because they do not understand what determines the price, they prefer an average price rather than a fair price based on the merit of the wool. Obviously the average price will not raise until the average merit of the wool is raised.

Improving the Wool Clip: In addition to breeding for an improved crop of wool there are several handling methods
that can be used to improve the value of the wool placed on the market. Some of the more important of these will be outlined briefly.

1. Exercise care, when feeding hay or bedding pens, to prevent straw or chaff from getting into the fleeces. Likewise, keep sheep out of burr infested fields at all times. Burry, seedy, or chaffy fleeces generally are classified by wool graders as off grades or rejects and sell for considerably less than fleeces of the same quality that are free from vegetable matter. The reason for the lower value is that fleeces with excessive vegetable matter content must be subjected to extra chemical or mechanical treatment before the wool can be processed into a high quality, finished material.

2. Make sure that the sheep are dry when they are sheared. Damp or wet wool deteriorates rapidly if it is packed in that condition. It becomes musty and develops an odor that is very noticeable and easily recognized by the wool graders. Wool that is musty sells at a heavy discount and consequently the producer loses money on this type of wool.

3. Have a careful, experienced shearer shear the sheep. Proper shearing is an important step in preparing a clip attractively for marketing. The value of the wool is determined partly by the uniformity of length of staple, and fleeces with a large amount of short wool, resulting from second cuts during shearing, will be reduced in value. A clean floor or canvas should be provided for the shearer to work on so that the fleece can be kept as clean as possible.

4. The manner in which a fleece is rolled and tied after shearing will affect its value. The purpose of this operation is to provide a fleece package with the most attractive and valuable parts of the fleece exposed to the grader's or buyer's eyes. The first step is to take the shorn fleece and spread it flesh side down on a clean floor or table. Then remove all dirty and wet tags and package these separately. If they are left in the fleece they may stain some of the good wool which eventually will be removed and placed in a lower grade, thus lowering the total value of the product.

The next step is to turn in all the loose ends such as the neck and leg pieces and
the belly part. The fleece at this stage should present a neat rectangular appearance. Fold the fleece lengthwise one-third the width of the fleece and then fold this double portion over with the remaining third. Then roll this folded part tightly together. If such a procedure is followed the clean, flesh-side of the fleece will be on the outside of the bundle and the weathered and frowsy ends on the inside of the bundle. A loss of one grade of wool in a good clip (4 cents per pound to the grower) is often made if the fleece is not tied with the flesh side out. Tie the fleece securely with about 8 feet of wool twine (twisted paper twine). The use of sisal twine or binder twine for either tying up the individual fleeces or sewing the wool sack shut will reduce the value of the wool materially and this twine should never be used under any circumstance.

5. After taking the pains to properly roll the fleeces into an attractive looking bundle of wool, do not undo these efforts by wrapping the fleece in an excess of paper twine and pulling the twine so tight against the fleece that it will compress the fleece into a small bundle. If this is done it will give the wool buyer the impression of a heavy shrinking fleece and a lower price per pound will naturally result.

6. If the wool clip must be stored, select a clean dry building and make certain that hay or straw chaff and bird droppings cannot contaminate it.

It is the large, bulky fleece, free from burrs, hay, and tags, tied with paper twine with the flesh side out that sells for the high price on the wool market. If and when the majority of the wool producers in this area follow these simple rules and suggestions the average price of wool in this area will increase in value several cents per pound.

### Pastures

Sheep excel in the utilization of grass and its conversion to saleable products. About 90 percent of the kinds of weeds growing on our farm pastures and ranges are eaten readily by sheep. Weeds along fence rows and aftermath in grain fields furnish cheap sources of feed for sheep.

While pasture, weeds, and grain aftermath should furnish the lambs' and ewes' entire feed during the summer months, sheep will not respond well if the feed offered them is coarse and unpalatable. Sheep like short grasses that are growing actively. If they are forced to exist on a dry, dead pasture, the lambs will lose weight and cannot be expected to sell as fat lambs.

The amount of pasture required to carry a ewe and her lamb depends considerably on the type of pasture, the amount of rainfall during the growing season and the age of the lamb. Usually five ewes and their lambs require about the same amount of pasture as one cow. Growing grasses and legumes furnish an excellent source of proteins and all essential minerals. Greater gains can be expected from growing lambs whose mothers are on grass than if the ewes and lambs were grain-fed in a dry lot. Lambs that are nursing their mothers and are on good grass usually gain one-third to two-thirds pound a day and will be fat enough to top the market at about 4 to 5 months of age.

Rotation of the pastures will help, to some extent, the control of parasites such as stomach worm and tape worm, as well as increase the carrying capacity of the pastures. This can be accomplished by dividing the field with a temporary fence into about four different pastures and moving the sheep from one field to another. Change of pasture should be more
frequent during the damp rainy weather, as parasite infestation is more severe under those conditions.

Contrary to popular opinion, cattle and sheep can be pastured satisfactorily in the same field at the same time. The carrying capacity is actually increased since the cattle feed on the taller grasses that sheep do not relish, and the sheep eat the grasses that are too short for the cattle to pick up. Sheep should not be pastured with horses as the horses tend to chase the sheep and too many lambs are crippled by being run over by a playful horse. Clipping the entire pasture when tall weeds and rank grass begin to predominate, will maintain a steady rate of growth of forage, hold the palatability high, and will result in more rapid gains on the lambs.

Selection and Type of Pasture: Too many flock owners rely on their poorest piece of land for pasture. Too often that land is poorly drained and is suitable only for growing permanent pasture of poor quality. Sheep which must rely on such pasture for their entire summer's feed are subjected to liver fluke infestations during the time when the pasture is wet and boggy, and stomach worms when it is dry. During the dry period in the summer, permanent pastures dry up and furnish little more than a place for the sheep to exercise.

Permanent Pasture: Permanent pasture, which usually contains blue grass, bromegrass, and quack grass in this area, can contribute a great deal to one's sheep enterprise. If the land is high and well-drained, this type of pasture furnishes excellent feed during May and June. It becomes dormant and woody during the hot summer months, but becomes productive again in the fall, usually from September until it freezes up.

Legume Pasture: Alfalfa and sweet clover are the two most commonly grown legumes in South Dakota. This type of pasture fits in well with most crop rotation systems and does much to restore the fertility of run-down pastures. A combination of legumes and bromegrass makes an excellent sheep pasture. While it cannot be pastured as early as our tame grass pastures, such as blue grass and straight bromegrass, it has greater carrying capacity and will furnish feed through the hot months. Its greatest disadvantage is that it may cause bloat. Usually, if the sheep are well-fed and not hungry before being turned on a legume pasture, are offered hay while on pasture, and then left on continuously, they will be troubled less

Fig. 6. The proper method of holding the sheep while drenching for internal parasites.
by bloat. There should be at least 50 percent bromegrass in the stand, as this helps reduce the incidence of bloat. Sweet clover, if pastured before it becomes too rank, is also a good sheep pasture and is less apt to cause bloat, though it is not as palatable as alfalfa.

**Temporary Pastures:** Rape sown with oats the latter part of May and early June furnishes an excellent summer and fall pasture. The rape will remain green and palatable and can be pastured safely long after all other pastures are frozen. It is an excellent type of pasture for ewes during the breeding season.

Sudan grass, that is planted in late May and allowed to reach 6 to 8 inches in height, furnishes a very succulent and palatable feed for ewes and their lambs during the hot summer months. It can be pastured down many times during the summer and rested each time until new growth reaches 6 inches again. It furnishes more palatable green feed per acre than any other type of forage that can be grown in South Dakota.

Making use of permanent pastures during May and early June, a legume and brome pasture or Sudan grass from late June to September, and rape or permanent pasture during late September and October assures the ewes of the best feed possible for maintaining their condition and a good milk flow. Their lambs will continue to grow and fatten with a minimum of expense and a maximum of profit. Experiments have shown that properly managed land used for pasture can be as profitable as the best grain crop.

**Parasites**

As every sheepman knows, internal and external parasites are among the greatest hazards in sheep production. Round worm or twisted stomach worm (*Haemonchus contortus*) is the most serious worm parasite of sheep. The principal symptoms of worm infestation are unthriftness, scouring, loss of weight, anemia, and swollen jaws. While severe infestations of round worm may cause sheep to die, the greatest loss comes from unthrifty, thin lambs that usually are sold at lightweight and cull prices.

**Internal Parasites**

The common tape worm (*Moniezia species*) is another bad offender. Loss of weight, anemia, unthriftness, and diarrhea usually accompany tape worm infestation. The tape worm is not nearly as serious, however, as the round worm.

An inadequate feed supply increases the susceptibility of sheep to parasite infestation and causes greater loss among sheep. Twenty to forty pound lambs, whose mothers are not milking too well, are more seriously affected by parasite infestation than strong, actively growing lambs. This is one big advantage of early lambing. The length of the life cycle of the round worm and tape worm varies considerably, depending on temperature and humidity. While rotation of pasture every 2 or 3 weeks helps control the infestation, it cannot be relied upon to take care of the worm infestation completely.

**Treatment for Worms**

**Phenothiazene:** One part Phenothiazene and 9 parts salt mixed together and offered as the only source of salt will keep round worm numbers down while the ewes and lambs are on pasture. However, 1 ounce of Phenothiazene in drench or 1 ounce mixed with one-half pound of grain per ewe should be given before starting the salt treatment if maximum results are to be obtained. If the Phenothiazene is mixed with grain, 10 to 12 sheep are all that can be treated at one time; if more than that number is treated at a time it is difficult to make certain each ewe gets her share of the
mixture. All ewes should be drenched in the fall and again before going to pasture.

**Copper Sulfate and 40 Percent Nicotine Sulfate**: A mixture of 4 ounces of copper sulfate and 3 ounces of nicotine sulfate in 3 gallons of water is still an economical and popular treatment for controlling round worm and is fairly effective in the control of tape worm.

**Dosage for Copper Sulfate and Nicotine Sulfate Solution**

- Adult sheep: 4 ounces
- Yearling sheep: 3 to 4 ounces
- 60 to 80 pound lamb: 2 to 3 ounces
- 30 to 60 pound lamb: 1½ to 2 ounces

All feed and water must be removed for 15 hours before drenching and 6 to 8 hours after drenching if the copper sulfate treatment is used. This is not necessary when using Phenothiazene.

**Lead Arsenate**: This drug has proved of great benefit in treating for tape worms and, while new, holds much promise. It is given in capsule form. The usual dosage is 7½ to 15 grains per lamb, depending upon the size of the lamb.

**External Parasites**

**Maggots**: During the summer many lambs will scour due to the laxative effects of fresh grass or worm infestation. A lamb that is dirty behind offers an ideal environment for flies to lay their eggs and for the development of maggots. Lambs affected with maggots will try to bite their hind quarters, stamp their hind feet, and usually get off by themselves. Turpentine or a strong solution of creosote dip will eradicate the maggots and the application of pine tar or some other fly repellent will prevent...
reinfestation. If the maggots are not eradicated, death of the lamb usually will occur.

**Sheep Ticks or Keds**: Sheep ticks are the easiest pest to eradicate of any of the parasites that affect sheep. The sheep may be either dipped in a large vat or sprayed. DDT, Methoxychlor, creosote, or arsenicals may be used. DDT and Methoxychlor are usually used as a spray, while creosote and the arsenicals are used as dips. They should be used according to the manufacturers’ directions. Regardless of which treatment is used, the cost is small and no sheep owner should let the easily controlled sheep tick suck away his profits.

**Fattening Home Grown Lambs**

There always will be a portion of the lamb crop in the fall that will not be fat enough from grass to sell as fat lambs and, if marketed before they are fat, will sell as feeders at a much lower price than the grass-fat lambs.

There is no easier way of making money than by weaning these lambs and putting them in drylot on a fattening ration. It will require 40 to 60 days and about 75 pounds of grain and 75 pounds of hay to make these lambs fat. These lambs when fat will then sell for about double the money they would have brought if sent with the other fat lambs and sold as feeders.

**Marketing Lambs**

As with other types of livestock, the price received for lambs is determined largely by the supply and demand. Spring lambs are in short supply in June and July and the prices are usually $2.00 to $6.00 higher than in August, September, or October. Thus, it is advisable to send fat lambs to market as soon as they weigh 80 to 90 pounds, rather than to wait for all the lambs to reach that weight. July and August are usually dry months and the pastures are poor, and often the lambs that were fat in June or early July actually lose weight during late July and August. By marketing lambs as soon as they are fat and as early as possible, before the heavy run of lambs starts, the greatest profit will be obtained. Early marketing of lambs also enables the ewe to put on weight on pasture and puts her in better condition for fall breeding.
Range Sheep Production

This part of the circular is intended primarily for those interested in entering the range sheep business, though there will be information of value and interest to present producers as well. General information of interest to both farm and range operators has been dealt with in the first part of the circular and will not be repeated but will be referred to specifically when modifications for range conditions are necessary.

It is realized that in an area so large and varied as the range area of South Dakota, satisfactory practices may differ from region to region. Basic requirements for successful sheep production remain the same, but such factors as the size and location of the ranch, the number and type of ewes maintained, whether rams are produced for sale, and whether both cattle and sheep are raised on the same ranch all will require modification in management practices.

During the past 50 years, the sheep industry has shown marked changes. Modern transportation and road systems make it possible for the ranches to get their products to market more readily. Competition from abroad, and changes in our tariff program have both contributed to the change in emphasis from wool to the production of fat lambs and feeder lambs during the last 30 years. At the present time in South Dakota, the sale of lambs, whether fat or feeder, constitutes from 60 to 80 percent of the gross income from range sheep, whereas 25 to 50 years ago wool was the major product on many ranches. With this change in emphasis, also has come a change in the type of sheep and management, and this circular will discuss briefly practices that may be of some help to men who are interested in entering the sheep business.

Type of Ewe

The type of ewe that will meet all of the requirements of various range conditions has not yet been developed and many of the older sheepmen doubt that there ever will be a breed that will surpass the Rambouillet for general adaptability.

It must be realized that the type or breed of ewe that will be most desirable in the Black Hills may be quite different from the type that will do best under the drier conditions that exist in the northwestern part of this state.

As mentioned previously, large ewes usually wean more pounds of lamb than lighter ewes. This is due to a higher percentage of twins, and the fact that the individual lambs weigh more. However, if the range is of low carrying capacity, there is a limit to the size of the ewe that the range will carry, since large ewes would have to cover a larger area in order to find feed to maintain themselves. On such a range, ewes weighing from 115 to 135 pounds, normally will find sufficient feed for themselves and their lambs, though 115 pounds should be the lower limit for range ewes. This usually will mean Rambouillet sheep, and the production of wool and feeder lambs will predominate. Ranges that produce more abundant feed will support larger sheep and it may be possible to wean a high percentage of fat lambs each year. In this case the white-face, cross-bred types of ewes, weighing 150 to 175 pounds, and producing three-eighths or one-half blood fleeces, will be most satisfactory. It may be desirable to cross such ewes with mutton breed rams to produce even a higher percentage of fat lambs and more weight per individual.
lamb. An additional advantage of such a cross in the improvement in type and conformation that can be obtained.

For the most part, range sheep operators in western South Dakota raise their own replacements, but those that follow the practice of crossing with mutton breed rams would either have to run separate bands for producing replacement stock or purchase their replacement stock. This is because crossbreeds carrying Down-breed blood (Hampshire, Suffolk and Shropshire) are not suitable as breeding females under range conditions so all lambs would have to be sold, but the producer usually can sell these cross-bred ewe lambs as fat lambs for considerably more than it costs to buy white-faced replacement ewe lambs of fine-wool breeding. Under this system the replacement ewes would be raised by the sheep producers operating on range that does not produce fat lambs in the fall. It has the disadvantage that there is no opportunity for the producer, who sells all his lambs, to improve his flock through selection and the continuous use of good rams, but this is compensated by the benefits of cross-breeding which increases the general over-all thrift, vigor, and weight of his lambs. This practice is followed with a great deal of success in some parts of the inter-mountain region and particularly the park areas of Colorado.

The Rambouillet still constitutes the basis for sound range sheep. In recent years new breeds such as the Columbia, Panama, and Targhee, which have been developed from crosses of long-wool breeds on Rambouillets, have gained favor in many areas. These newer breeds are larger than the Rambouillets and the limitations already discussed will apply. The comparative advantages of the Rambouillet and these other breeds, often referred to as cross-bred types, may be summarized as follows:

Advantages of the white-face cross-bred types:
1. They are more prolific.
2. They are better mothers.
3. Where feed conditions are favorable, they will produce more milk.
4. They produce longer stapled, lighter shrinking wool and usually more wool.
5. They produce more pounds of lamb and lambs of more desirable conformation.

Advantages of the Rambouillet:
1. They have a longer productive life.
2. They are hardier, better rustlers, and have lower maintenance requirements.
3. They are better travelers and have harder hoofs.
4. They do not lose as much wool in sagebrush areas.

Culling the Ewe Flock

In culling the flock the lambs should be separated from the ewes. After the ewes and lambs have been separated, the wether and ewe lambs should be separated. It is a simple matter to gate-cut the wethers from the ewe lambs if one ear of each wether lamb has been cropped.

In the fall of each year, selection should be made for future breeding stock within the band. Since this usually means that from five hundred to two or three thousand head of ewes and lambs must be examined, it is absolutely essential that a good set of corrals and cutting chutes are available. These should be arranged so that the band can be cut two or three ways. For the most part, sheep move better when they are moved up a slight incline, so wherever it is possible, the corrals should be arranged so that the sheep are run through the chute in that manner. Some operators prefer to have the cutting chute just wide enough for
Fig. 8. Plans for a model set of corrals. These may be modified to suit the sheepman’s needs.
the ewes to pass through so there is no chance for them to turn around. Others prefer the chute wide enough for a man to work in the chute alongside of the ewes. A plan of a modern set of corrals and cutting chute is shown in Fig. 8, so no lengthy discussion of them will be given here.

The University of Wyoming has developed a system of culling ewes that makes it possible for the sheep operator to cull large numbers in a short period of time and still do a good job of culling. This system is called the "touch system" and is based on fleece length and density and general over-all size and thriftiness of the ewe. (Ewes that have fuzziness or breechiness about the flanks and wool-blind ewes are culled as well.) The operator handles each sheep in the chute by poking his fingers into the wool in the hip region and estimating approximately the density and length of the staple of the fleece. At the same time he gets a visual estimate of the size and conformation of the ewe and marks for culling those that do not fulfill his requirements. While this system may not be as accurate as individual handling of the sheep, it does make it possible for the sheep operator to cut out about 20 percent of his low-shearing ewes. Mouthing to determine the age of the sheep and the condition of the teeth, and handling for udder soundness can be done at the same time.

Breeding Season

In South Dakota the breeding season on the range commences about the middle of November for those who want April lambs, and about December first for those who want May lambs. The type of range and management practices followed will determine largely the breed of ram used. A brief discussion of the type of rams to use is given on page 5.

From weaning time through the breeding season the ewes should be grazed on good range saved for this purpose. This will enable the ewes to put on some weight and be better able to stand the adverse conditions that often exist during the winter months. During this same period the breeding rams should receive supplemental feed to get them into good breeding condition. This is often a problem during the breeding season under range conditions where the ewes are not corralled each night. If such is the case, the rams should be divided into two groups and the two groups should be used alternately for about a week or ten days at a time. Where ewes are corralled at night, the rams can be cut out and fed separately. If either of these practices is followed, a higher percentage of the ewes will be bred and the ewes will lamb during a shorter period of time the following spring. Three rams per hundred ewes is the recommended number of rams to be used under range conditions.

Winter Feed Requirements

The feeding and management of ewes under range conditions is quite different from the practices followed under farm conditions, since the number maintained in a band is many times that maintained under farm conditions. Transportation is difficult and available roughage often limited; consequently, the amount of grain or concentrate fed in proportion to hay is quite different from that fed to farm flocks. Wintering range ewes on the available grass and the ewes own body reserve has long since been proved unprofitable, but it is only sensible that the best use of the grasses on the winter range be made for minimum operating costs and maximum profits.

Larger, stronger, and thriftier lambs usually are associated with good winter
rations. When adequate feed is provided for the ewes during gestation period so that they are in good condition, they lamb with a better milk supply and have more mothering instinct than those that are thin and have an inadequate milk supply.

The amount of feed required to maintain the ewe band varies considerably depending upon the following conditions: when the ewes are to lamb, the quality of roughage, the size of the ewes, the amount of available winter range and, most important, the amount of snow cover.

The last four to six weeks of the gestation period is the most critical since the unborn lamb is making the greatest growth and development at that time. In addition, as the winter advances the amount of nutrients, particularly protein, in the grass declines, consequently the greatest amount of protein supplement is required at that time. Pregnant ewes should receive the equivalent of 3 to 4 pounds of good quality roughage per head daily. This may be furnished largely by winter grazing, or combinations of winter grazing, hay or concentrates. Regardless of the form in which the ewes receive their feed, it should be adequate to keep them from becoming thin and weak. Protein is usually the limiting factor in the winter ration, and should be given the greatest consideration when purchasing supplemental feeds. Many of the difficulties of feeding the ewe band during the winter can be alleviated if arrangements are made during the summer and fall to have hay and other feed hauled to the area where the ewes will be wintered.

A brief discussion of some typical rations is given in order to further clarify this subject. If good winter grazing is available during the entire winter period,
.15 to .2 pound of 40 percent concentrate per ewe daily usually is fed from December first until about six weeks before lambing. During the last six weeks of the pregnancy period, the concentrate should be increased to about .5 to 1 pound per ewe daily. If the winter grazing is poor, .3 to .5 pound of corn or a pelleted feed with a high percentage of carbohydrate should be added to the amounts of feed already mentioned for the early portion of the gestation period. In case no winter grazing is possible, 3 pounds of good quality wheatgrass or alfalfa hay should be provided per ewe daily during the early part of the gestation period, plus about .2 pound 40 percent concentrate if the hay is wheatgrass or some other non-legume hay, and .25 to .5 pound of concentrate should be added the last six weeks of the gestation period to that already being fed. If hay is not available, or it is impractical to feed, as is often the case during the severe weather, three-fourths to 1 pound of concentrate should be provided per ewe daily. One pound of 40 percent concentrate is equivalent to 3 to 4 pounds of alfalfa. Bear in mind, however, that sheep need bulk in their ration and cannot live indefinitely on concentrates alone, though straight concentrate feeding for a week or two will cause no ill effects. If preparations are made during good weather to have hay near the sheep, the feeding of concentrates alone should not have to be continued over too long a period.

It is not meant to be implied in any way that it is advantageous to maintain ewes in a high condition. Thrifty, strong ewes in moderate condition will do as well as ewes that are carrying an excess of fat. Iodized salt and water are very essential, and in some areas the feeding of a mineral supplement in addition to the salt may be advantageous.

Lambing Time

The percentage of lambs born and weaned should be of as great concern to the range operator as to the farm flock owner. In order to wean a higher percentage of lambs in relation to ewes bred, attention must be given to the raising of twins as well as singles.

Two systems of lambing usually are practiced under range conditions: shed lambing and range or open lambing. Under both systems the drop band is grazed during the day. Under the shed lambing system, which is used mainly when lambing occurs in late March or early April, the ewe band is corralled at night and the ewes lambing at that time usually are put in jugs (individual pens) by the night man. During the day the ewes that lamb are picked up as soon as they lamb and placed in a wagon or truck with individual pens in it, and the ewes and lambs are hauled back to the shed and put in jugs. They are left in the jugs for about 24 hours, and then small bands of ewes with young lambs are turned out to graze if the weather is moderate. Proper sanitation methods must be followed under shed lambing conditions to prevent outbreaks of disease.

As the lambs get older, two small bands are thrown together to make a larger one. This is repeated over and over during a three or four week period until bands of four or five hundred ewes are accumulated. These ewes are kept separate from the drop bands. Supplemental feeding is provided and the best range is used for the ewes and their young lambs.

Range operators who plan to lamb their ewes during the latter part of April or in May, usually follow the open range system of lambing. Basically this system does not differ greatly from shed lambing, but temporary corrals are used in-
instead of a permanent corral for holding the drop band and no protection is provided, other than the protection that might be available in canyons and bluffs. The ewes lambing during the night are put in small pens by the night man. The rest of the band is turned out to graze during the day.

Ewes that lamb during the night usually are shunted into small groups and allowed to graze for a day or two before being turned into larger groups for grazing. During the day, the ewes that lamb may, or may not be brought back to traps depending on the weather, and also upon whether or not any other artificial shelter such as tepees are provided.

With the uncertainty of the weather during the latter part of April or early May, lamb jackets or blankets are kept available by many of the ranch operators in order to prevent heavy death loss due to inclement weather. A lamb jacket is nothing more than a blanket-lined canvas that is slipped over the lamb. It has elastic leg bands and an elastic band across the breast. This is a great help during a spell of cold nasty weather.

Small canvas tents, called tepees, which are 3’ x 3’ x 3½’, are a type of shelter which is often used. Ewes lambing during severe weather are put under tepees, singly, along with their newborn lambs and left there for about a 24-hour period. They are then released and shunted into small groups and kept separate from the drop band. Both the tepees and the lamb blankets are excellent insurance against the heavy death losses that can occur from chilling during inclement weather.

The practice of opening the teat so as to aid the lamb in getting milk, the assistance that is sometimes needed by the ewe during lambing, the care of sick lambs with sore eyes or of constipated...
Sheep Production in South Dakota

lambs, have all been discussed on pages 8 and 9.

Docking and castrating done under range conditions does not differ greatly from that done under farm flock conditions and is discussed on pages 10 and 11.

In South Dakota the range operator, who lambs in April and early May, will find that creep feeding is not advantageous, unless the range is of such poor quality that extra feed is necessary in order to keep the lambs from becoming stunted in growth.

Shearing

Practically all of the commercial shearing in western South Dakota is done by large shearing crews who travel through the western states. The range operator, of course, must provide facilities for holding the ewe band, as well as cutting chutes and holding pens needed during shearing. A detailed discussion of wool preparation is given on page 11 through page 13. Shearing plans will differ as widely as almost any other phase of the sheep operation and it would be wise for the new operator to visit some of the successful sheepmen, and notice their sheep shearing set-up. In that way, one can benefit from the other man's experience.

Range Management

Proper range management implies the use of the range in such a manner so as to provide maximum returns without damage to the plant life on the range.

Range management is dependent mainly on two factors, proper stocking rate and proper distribution of grazing. A thorough knowledge of grass and other range plants found on a particular range, topography, climatic conditions, and length of the grazing season are all necessary in determining correct stocking rates. The distribution of grazing is often a problem. A portion of the range should be allowed to rest at some season of the year to give it a chance to recover and store plant food for the coming season. Further, a portion of the range should be allowed to reseed itself at least once every four or five years. This prevents areas from thinning out, and encourages growth of several varieties of

Fig. 11. Well-distributed watering places encourage a better use of ranges and increase the carrying capacity.
Having well-distributed watering and salting places and moving the sheep to a different part of the range by the herder every week or two will help distribute the grazing as well as control internal parasites. Whether the range is fenced or the sheep are herded, if the above mentioned factors, accompanied by proper stocking, are practiced greater range returns will be obtained. Circular number 804 published by the United States Department of Agriculture contains some excellent information on stocking and range management for sustained high production.

Lengthening the grazing season is one of the best methods of cutting operating cost. This entails the planting of varieties of grass that will commence growing earlier in the spring than is possible with many of the present species of range grasses.

One of the best early grasses for early grazing that is adapted to conditions in the west river country is crested wheatgrass. Crested wheatgrass greens up and commences to grow about three weeks to a month earlier than our other range grasses. Planting an area to crested wheatgrass is sound range management and will make it possible to decrease the winter feeding costs and increase the carrying capacity of the range. A publication by the South Dakota Experiment Station, Bulletin 361, discusses the various range grasses and their application to sound range practices.

It is realized that most range operators follow the practice of selling their lambs during the months of October and November. An earlier sale of lambs should be made when the range is poor and the lambs have ceased to gain, since the slight increase in weight made during the months of October and November may not be enough to offset the greater cost of production and the depletion of the range. In addition, many lamb feeders in the corn belt are willing to pay a premium for early lambs that can be delivered in the month of September. This makes it possible to turn the lambs on rape pasture and make cheap gains or to condition them for lambing-off corn or going into the feedlot for fattening.

Summary

The sheepman's profits depend largely on the following points if a successful enterprise is to be realized:

1. Maintaining a productive ewe flock, i.e. one that shears 10 to 14 pounds of wool per head and lambs at least a 125 percent lamb crop.
2. A large percent of fat lambs weaned, weighing 80 to 90 pounds.
3. Economical wintering of the flock.
4. Providing a good pasture program.
5. Parasite control.