

# AGRICULTURAL EXPERIMENT STATION

KANSAS STATE COLLEGE OF AGRICULTURE  
AND APPLIED SCIENCE

MANHATTAN, KANSAS

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## SHEEP PRODUCTION IN KANSAS

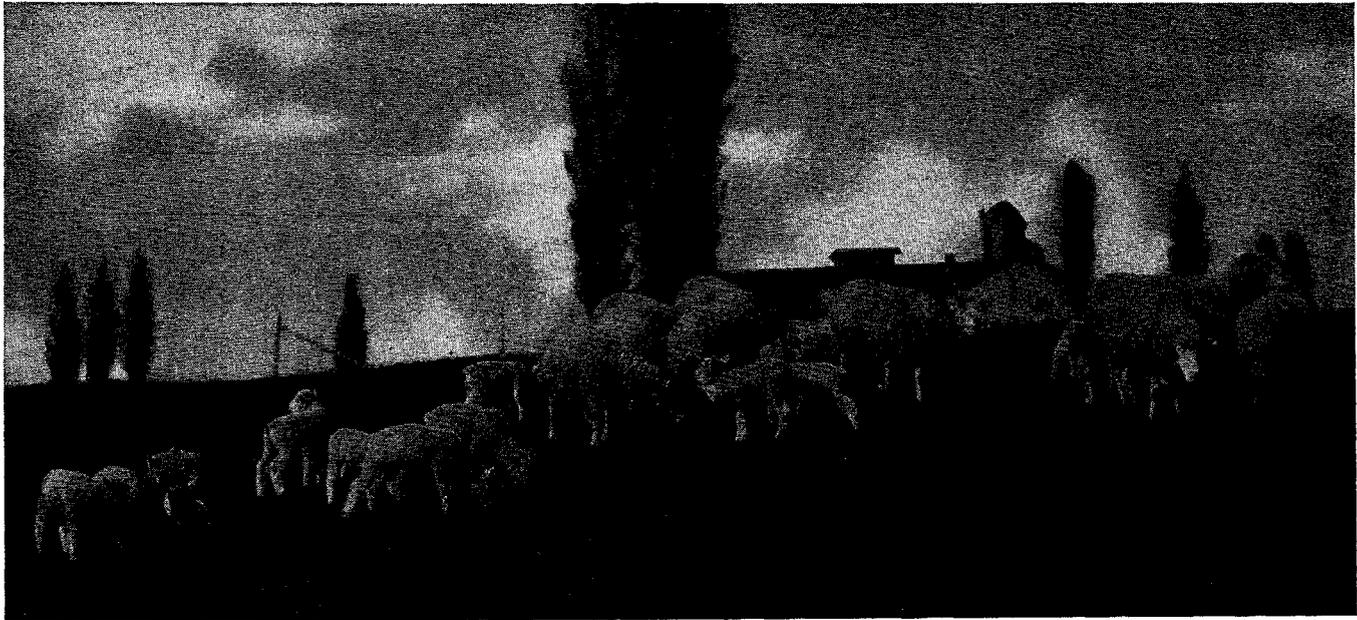


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DORSET FALL LAMBS AND THEIR MOTHERS ON RYE PASTURE

# SHEEP PRODUCTION IN KANSAS <sup>1</sup>

R. F. COX and H. E. REED

## I. INTRODUCTION

Of the several specialized branches of the sheep industry, only two, farm breeding flocks and western lamb feeding, are of very considerable importance in Kansas, while a third, that of purebred sheep breeding, is increasing steadily but slowly. During recent years increased interest has been manifested by Kansas farmers in all of these phases of production. The requests by farmers for general and specific information from the Agricultural Experiment Station have been extensive and it has been deemed advisable to present this information in bulletin form.

Another bulletin from this Station is given over exclusively to the feeding of western lambs. Therefore in this bulletin an attempt will be made to give general and specific information on the breeding sheep industry, particularly as it relates to spring lamb production in farm flocks, and to purebred sheep breeding. The frequency of the inquiries received has had much to do with the extent to which various subjects have been given prominence and stressed in this publication.

### THE WORLD'S SHEEP INDUSTRY

A survey of the distribution of sheep over the various parts of the world reveals that of the six or seven leading sheep producing countries all except two, the United States and Great Britain, lie in the Southern Hemisphere. This disregards the sheep population of Russia which, while large, barely enters into or affects the world commerce in sheep or wool since normally little wool or mutton (lamb) is either imported or exported by that country. Further study of sheep distribution shows that, with a single noteworthy exception, all or an important portion of the chief sheep producing countries are sparsely settled, pastoral, and more or less remote insofar as transportation and markets are concerned. Sheep and wool production lend themselves better than almost any other agricultural endeavor to pioneering or frontier conditions.

Handled on an extensive or range scale, sheep have a low labor requirement, are not exacting in the matter of shelter and equipment, and wool, one of the important sources of income, is almost non-perishable. While apparently bulky, actually it is a very concentrated product, comparing favorably or surpassing in value even in its unprocessed stage as it comes from the animal, the most concentrated agricultural products such as dressed meat, butterfat, or eggs.

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**Acknowledgment.**—The authors are indebted to Thomas Dean, shepherd of the station flock, for his helpful suggestions in the preparation of Section III of this bulletin.

1. Contribution No. 153, Department of Animal Husbandry.

Neither wool nor feeder lambs suffer materially or deteriorate markedly in value as a result of slow or extended transportation. Particularly noteworthy in this connection are the countries of Australia, Argentine, Union of South Africa, Uruguay, and New Zealand which ship wool and fat lamb carcasses from six to twelve thousand miles to their chief markets. The latter country, composed of two small islands approximately twice the area of Kansas, has four-fifths as many sheep as does the entire United States.

The outstanding exception referred to above is that of Great Britain. It is one of the leading sheep countries, and yet one which is characterized by having a very dense human population, intensive farming, relatively high land values and is highly industrialized. The fact that the sheep industry continues so important in the British Isles is ample proof that while sheep are ideally adapted to frontier conditions, they are also able to compete favorably with more intensive agricultural endeavors.

In each of the above countries, generally one phase of sheep production has gained prominence over all others, and each country specializes more or less in that line of production. In the United States we have them all; range sheep production, farm flock breeding, spring lamb production, hot house lambs, purebred breeding, and extensive feeding areas, each localized or centralized to some extent in one or more areas. In a measure the United States sheep industry represents a cross section of the sheep industry of the world. It is the authors' purpose here to present a sort of outline picture of the industry under consideration, and then to see just where Kansas fits into this scheme.

Sheep production in the early days of America's development, was purely local in its aspects. However, it first grew to be national and finally international in scope until at the present time a really successful sheep man who has a large investment in the business must know something of the problems not only of the Kentucky spring lamb producer, the range sheep man in the west and the lamb feeder, but also that of the Australian or Argentine producers. The more a producer knows of the industry at home and abroad, the better position is he in to cooperate or compete with them, whichever may be the case.

### THE SHEEP SITUATION

In the United States as a whole there has not been a very definite trend in production for many years. There have been some important shifts in production between areas within the country, however, and further reference will be made to some of the leading areas.

The number of sheep in the United States increased steadily and rapidly after the Merino craze in the early part of the Nineteenth century. Great expansion took place in the sheep industry in the range states following 1870. The eastern part of the country was paying some attention to the mutton side of the business, but in the West all development was on a wool-production basis.

Up to about 1910 the number of stock sheep increased in the western states, but decreased in the native sheep states. From 1911 to about 1923 the trend in numbers was downward in both areas, but from 1923 to 1931 the trend was upward in both areas, with a sharp increase in the western states. The numbers for the country as a whole were almost stable, showing some tendency to increase until in 1937 a steady climb in numbers set in and reached a peak in late 1941. At the present time there are approximately 55 million sheep in the United States, representing about a 3 percent decrease from the 1941 high numbers.

In spite of the fact that the total sheep population has not fluctuated markedly, the total slaughter of sheep and lambs has increased steadily. This may be attributed to the fact that the range states and most of the Corn Belt states are on a lamb-production basis. Where large bands of yearling, two-year-old, and older wethers were formerly maintained for wool production, bands of ewes are now kept and the percent of turnover is much larger. Approximately 95 percent of the sheep reaching our central markets are lambs. Apparently, then, the number marketed in any one year would depend on the size of the lamb crop and the ability of the sheep men to carry the lambs to a marketable age and condition.

Wool production has run pretty well hand in hand with the number of sheep, when it is considered that a large number of sheep of mutton type have replaced some of the wool-type sheep in the flocks of the country. Annual wool production of the United States is about 350,000,000 pounds at present. Normally this represents roughly 65 percent of our annual domestic needs, however, at the present time (1943) this represents only about 35 percent of our war time needs. The remainder must be imported, and even in peace times we import one-third of what we use. This in itself would imply the need of an increase in the sheep population. As a matter of fact the solution is not that simple. An increase in sheep population sufficient to produce all of our wool requirements certainly would not be a strain on our agricultural resources. However, it would result in increased production of lamb for which we have not yet developed a domestic demand, nor do we in normal times have any export outlet for it.

Considerable increase in the quantity and quality of wool is possible however, without a corresponding increase in the sheep population. Certain factors of management, most important of which are selection for wool production, better feeding and an adequate dipping program, would result in at least a 10 percent increase in wool production from the sheep we have at the present time. This course, rather than general expansion of the sheep industry, would seem to be more advisable in view of the foregoing situation.

**KANSAS AS A SHEEP STATE**

Back in the Eighties Kansas had twice as many breeding sheep as today, but sheep production was then on an entirely different basis than at present. At that time Kansas was a pioneer country and lacked transportation facilities. As pointed out previously sheep always gain prominence in new countries, because large numbers can be kept with a minimum of labor and because wool is a staple product, which can be transported long distances at a cost small in proportion to its value, or can be stored with little shrinkage or deterioration.

In the Eighties wool was the only product of the Kansas flocks for which there was a market. Then came the tariff manipulations which broke the wool market, and the Kansas sheep man was left "high and dry." Lamb was unknown in those days as a marketable commodity and people did not want mutton. So with the market for the only product of their flocks gone, Kansas sheep men did the logical thing and quit the sheep business.

At present an entirely different state of affairs exists. American people still refuse to eat mutton, but they have learned to like lamb.

Kansas is admirably situated in many ways with respect to the sheep industry. Kansas native spring lambs offer great opportunities. The climatic conditions are such that early lambing may be practiced without exorbitant expense for housing. January and February lambs may be marketed in May more easily than March lambs. Kansas farmers have little competition when marketing lambs in May.

The western ranges offer many opportunities for the purchase of breeding ewes and feeder lambs. Nearby markets—Kansas City, Omaha, St. Joseph, and Wichita—afford a good outlet for sheep without an excessive railroad haul. The location of the state between the range country and the river markets permits the "feeding in transit" rule of the railroads to cut freight costs considerably for the Kansas farmer and feeder. This provision allows sheep loaded in the range country, and billed to a terminal market, to be stopped at intermediate points for a six to twelve months' feeding period with but little additional transportation cost.

Sheep fit well into farming operations as practiced in Kansas. The greater part of the work with sheep comes at a time when routine farm work is light, and sheep give the least trouble and require the least care when the farm work is the heaviest.

**THE SHEEP MAN**

Sheep are not in any sense a "get rich quick" proposition. Under present conditions they will, if handled properly, return a profit commensurate with the care and attention given them. Obviously, then, if the success or failure of a sheep proposition is going to hinge on any one factor, that factor would be the man who is handling them.

To get the greatest return from a flock it is necessary to have a

knowledge of sheep, and this can be had only from experience with them. Books, bulletins and other printed matter will give the owner many ideas as a basis on which to work, but in no wise can they replace practical experience.

The beginner should not be led by tales of exorbitant profits to stock up beyond his abilities. It is much better to start with a small flock, such as a one or two ram unit of 40 or 80 head and grow into the sheep business. It is likely that at first he will make some mistakes. He will be better off if his mistakes affect only a few sheep rather than a large flock.

Men who are more familiar with other classes of livestock than they are with sheep think sheep are very peculiar animals requiring peculiar methods of handling. Their peculiarities are in the majority of cases traceable to their habits and nature, which can be learned only through experience with them. When these are known the handling, care and management become simple. Regardless of the class of livestock handled, greatest success comes to those who know more than their livestock know, and sheep are no exception in this respect.

## II. TYPES AND BREEDS OF SHEEP

### TYPES OF SHEEP

**The Why of Type.**—The different types which exist today in breeds of sheep have been largely developed by specialization in the production of mutton or wool, or adaptation to special climatic and geographic conditions. Since they have been developed by specialization, the type which is efficient in the production of meat is generally lacking in the characteristics which are essential for high wool production. This has been brought about by the fact that selection has been made for characteristics necessary to obtain the desired end and at the sacrifice of the characteristics of the other.



FIG. 1.—Mutton type (medium wool). (Champion crossbred wether, International Livestock Exposition, Chicago, 1925. Bred and owned by Kansas Agricultural Experiment Station.)

**The Value of Type.**—Type is necessary to the studied selection of breeding stock. When a breeder or farmer wishes to obtain stock he knows to what use he intends to put it. Consequently he selects the type best adapted to his purpose. Type should not be confused with breeds, for there are many breeds of sheep within each type.

Two general types are recognized in sheep—the mutton type and the fine-wool type. The mutton type has been developed to produce the most mutton in the shortest time and on the least feed. The fine-wool type has been developed to produce the most wool of the finest quality. Each type is lacking in the more important characteristics of the other, although some breeds are efficient in the production of both mutton and wool. The popularity and demand for either type

will depend on the market offered for the product and the adaptation of either type to certain climates, countries, and conditions.

**The Mutton Type.**—The mutton type calls for the conformation that will allow the most space in which to lay on meat. This is the blocky, broad, low-set, compact type. It stands to reason that an animal of this type will develop more quickly and be thicker in the region of the high-priced cuts, which in the sheep are the back, loin, and hindquarters, than one which is the opposite in conformation.

The ideal mutton sheep has a short, broad head. A wide muzzle with large nostrils is desirable because it is an indication that the respiratory organs are able to function properly, insuring, in a meas-



FIG. 2.—Mutton type (long wool).

ure, the health of the animal. A large placid eye denotes docility and quietness and such a sheep will fatten more readily than one which is nervous and easily frightened.

A short, thick, full neck, blending smoothly into the shoulders, is associated with the short, broad head. Mutton sheep have been bred and selected to have large full muscles, productive of a large proportion of lean meat. Fullness in the neck indicates that there are heavy muscles back in the body.

The shoulders of a sheep furnish desirable cuts, so they should be compact on top, and smoothly and evenly covered. A depression back of the shoulders is an indication of poor chest capacity, and so the heart girth should be large, the chest, wide and full, and the brisket broad, full and prominent, as all these characteristics are indicative of constitution.

The back should be strong, wide and straight, the top and underline of the animal being parallel. The width of the back is de-

terminated wholly by the spring of ribs. So to insure plenty of width to allow framework on which to lay valuable meat, the ribs should be widely sprung, and in addition be long, close together and well covered with muscle. A short coupling is necessary to give symmetry and balance to an animal of this type, and with a short loin, width and thickness of loin may be expected.

Length from hips to the dock is very desirable with the hips smooth, well covered and level, any appearance of angularity being avoided. Width of rump may be had if the width is carried from the hips to the pin bones. Drooping rumps, peaked rumps and rumps which are not level are very undesirable.

Both thigh and twist should be broad, deep and full. The legs

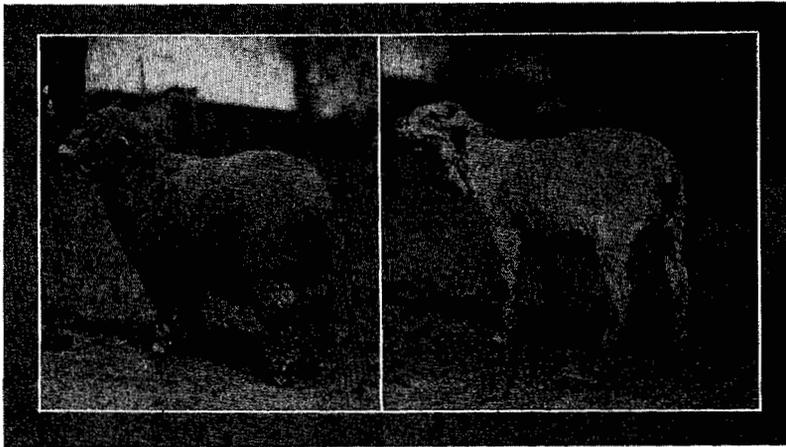


FIG. 3.—Fine-wool type (C type).

should come out of the four corners of the body and the animal should stand squarely on them. Width between the forelegs makes for a wider chest, and width between hind legs insures more room for the proper development of the leg of mutton.

Such a sheep puts both flesh and fat on quickly and smoothly. One without this type rarely does so. The type herein described is merely accentuated by fattening. Breeds of both medium wool mutton type (Fig. 1) and lung wool mutton type (Fig. 2) types have the conformation, varying in size, color markings and minor characteristics with the different breeds.

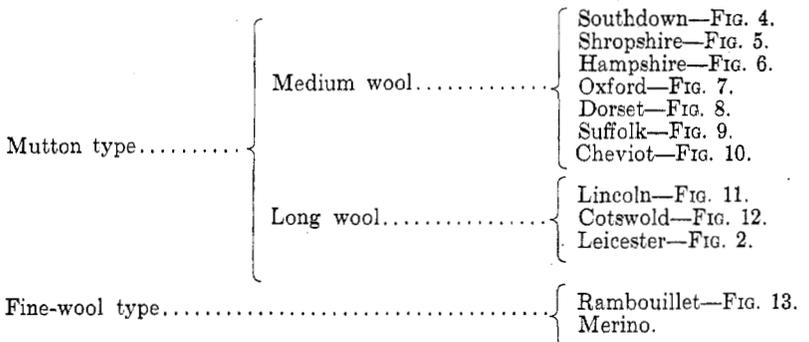
**The Fine-wool Type.**—In the fine-wool type wool production has been the aim of breeders. Selection has been based on fineness of fiber, heavy shearing fleeces, and in recent years more attention has been given to lighter shrinking fleeces. In conformation the fine-wool type offers quite a contrast to the mutton type. Symmetry of form is lacking in sheep of the fine-wool type, but uniformity of

fleece, fineness of fiber, even distribution of yolk, and all that is considered desirable in wool is there in quantity.

Fine-wool sheep have folds of skin or wrinkles about the body varying from many to almost none at all. Some specimens, the A type, have these wrinkles over the entire body from the head to the dock, the heavier folds being about the neck. The B type has folds on the forequarters and hindquarters, and the C type has folds only on the forequarters (Fig. 3) or they may be entirely smooth and free from folds as some of them are being bred now. Obviously the C type is the most desirable of the wool types for mutton production, or for combined meat and wool production.

Aside from their wool proclivities, sheep of the fine-wool type are noted for their gregariousness or flocking instinct, hardiness and ability to subsist on scanty fare. These qualities are desirable in the range country and without them it is doubtful whether the sheep industry as now conducted would be possible in the range states. They also have a dense oily fleece which withstands the alkali of the western range with little or no damage.

**Types to Which Breeds Conform.**—The types to which the common breeds of sheep conform are shown in the following chart:



**BREEDS OF SHEEP**

It is not intended herein to give a history of the breeds of sheep, but merely to give their distinguishing characteristics and, in certain breeds, their adaptability to Kansas conditions.

**The Southdown.**— The Southdown breed of sheep enjoys the distinction of conforming more nearly to the ideal mutton type than any other breed. (Fig. 4.) In size they are small, mature rams, in breeding condition seldom reaching 200 pounds and ewes 115 to 130 pounds. The Southdown fattens more quickly than other breeds and because of the flavor, grain, and firmness of its flesh has no superior as to quality of mutton. Southdown flocks shear an average of 6 to 7 pounds of wool, mostly 1/2 and 3/8 blood or 56's to 60æs grade, but often not of combing length. Uniformity of fleece is excellent in this breed.

The color markings of the face and legs are preferably a light-brown mouse color. Breeders object to extremely light-and-dark-colored points.

In spite of its desirable characteristics the breed is not produced in large numbers. The 1940 census reports about 14,000 head for the United States.

The discrimination in favor of other breeds on the part of sheep men may be attributed to the Southdown's lack of size and light

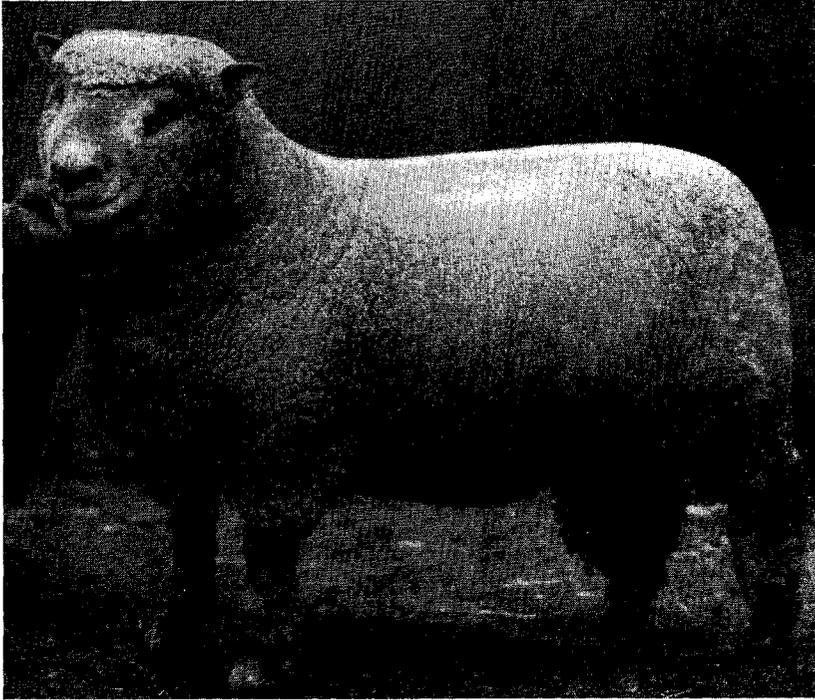


FIG. 4.—Southdown ram. (First prize ram lamb, American Royal Livestock Show, 1935. Bred and showed by Kansas Agricultural Experiment Station.)

wool production. When crossed on other breeds the Southdown imparts to its offspring much of its own type, thickness of flesh, and feeding ability. Most of the quality spring lambs produced in central Kentucky, which have an international reputation, are produced by crossing Southdown rams on grade ewes from the range states. Likewise the famous Canterbury lambs of New Zealand are sired mostly by Southdown rams.

Southdowns are medium early in lambing habits and may produce around 120 percent lamb crop. They are not heavy milkers as a rule. Southdowns are hardy but do not thrive under range conditions.

**The Shropshire.**— There is not, strictly speaking, a dual purpose breed of sheep, yet the Shropshire approaches as nearly as any breed what might be classed as one. They are efficient in both meat and wool production but with greater emphasis having been placed on meat than on wool production.

The ideal Shropshire (Fig. 5) is much like the Southdown type, but is larger and has longer wool. The rams weigh from 190 to 240 pounds and the ewes from 120 to 135 pounds. The Shropshire ranks next to the southdown in mutton type, and leads all medium-wool breeds, with the exception of the Oxford, in wool production. They

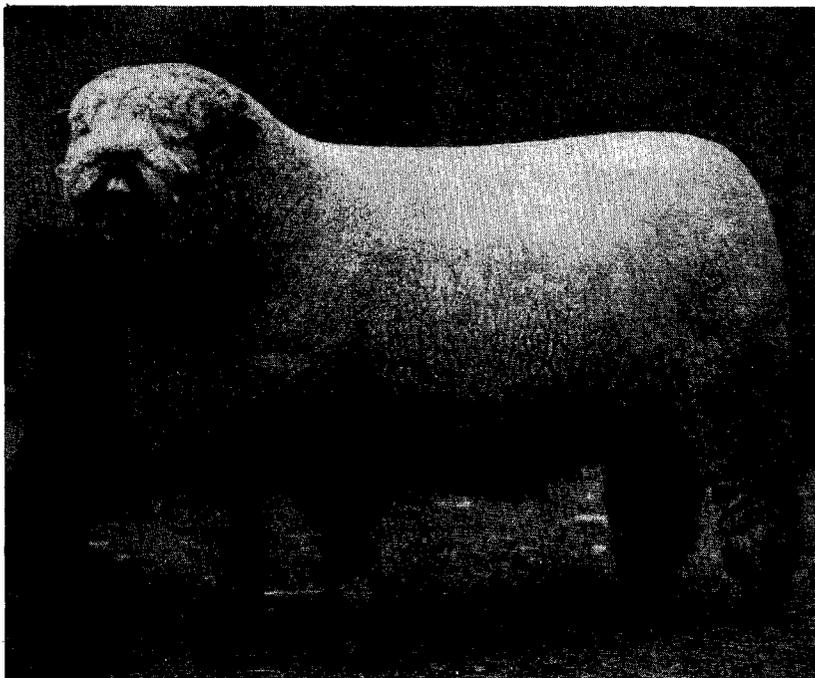


FIG. 5.—Shropshire ram. (First prize ram lamb, American Royal Livestock Show, 1932, and first prize yearling and grand champion Shropshire ram, American Royal Livestock Show, 1933. Bred and owned by Kansas Agricultural Experiment Station.)

are inclined somewhat more toward a rectangular build while the Southdown shows somewhat more roundness of form. Shropshire ewes shear from 8 to 8 $\frac{3}{4}$  pounds of wool which should grade  $\frac{3}{8}$  or 56's and be of combing length. They are good mothers, producing 125 to 130 percent lamb crop, but they are not early lambers.

The most distinguishing characteristics of this breed are the wool cap which extends down to the muzzle, and wool on the legs, which

runs down to the pasterns. The color markings of both face and legs are dark brown, or often nearly black in recent years.

More uniformity within the breed would be highly desirable for Shropshires. A large number of breeders in the United States handling small flocks makes for some lack of uniformity within the breed.

The Shropshire is the most popular breed of sheep in Kansas and one of the most popular in the United States as a whole. In recent years Shropshire men have paying more attention to vital characteristics such as size, constitution, and vigor, and not so much to wool cap and leg covering. They are therefore introducing more hardiness into the breed. There is no demand on the part of range breeders for Shropshire rams—they are strictly a farm breed.

**The Hampshire.**— The Hampshire of the present time is a large sheep, ranking second among the medium-wool breeds in this respect. This breed presents an attractive appearance, with its black face, ears and legs, and strong wide muzzle. (Fig. 6.) Hampshire rams weigh from 225 to 285 pounds and the ewes around 165 pounds. Eastern breeders prefer a smaller, more refined and blockier type, while western breeders want size and ruggedness.

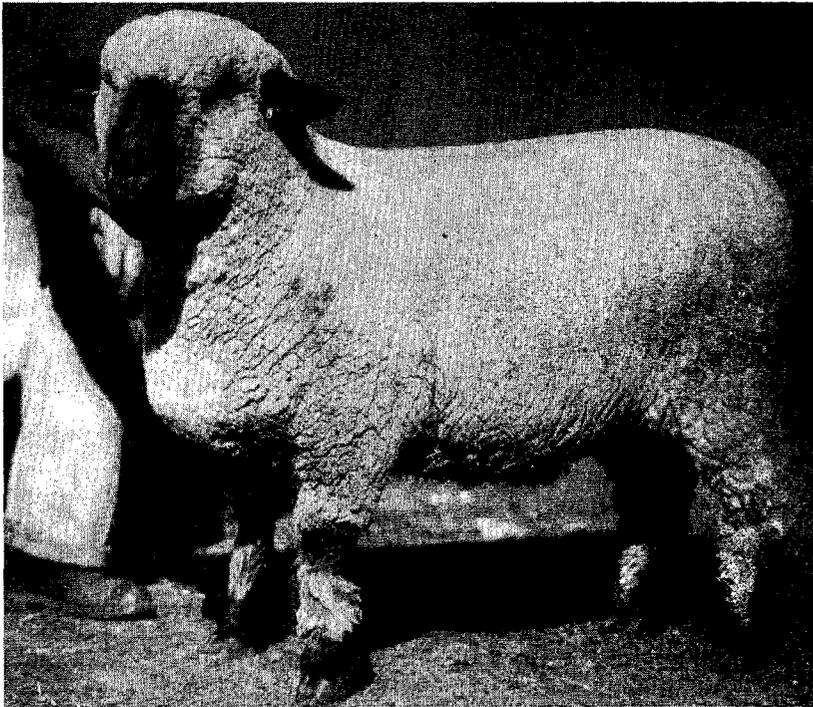


FIG. 6.—Hampshire ewe. (First yearling and champion ewe, American Royal Livestock Show, 1934. Bred and owned by Kansas Agricultural Experiment Station.)

Hampshires are adapted to a wider range of conditions over the country than the other mutton breeds, which is largely responsible for two distinct types being produced. They do not shear as much nor as good quality wool as Shropshires. Hampshire ewes should average about  $7\frac{3}{4}$  pounds of wool which will grade mostly quarter and low quarter blood or 46's to 50's and all of which should be of combing length. They are among the earliest lambers of the mutton breeds and very prolific. Lamb crops of 140 to 150 percent are not unusual.

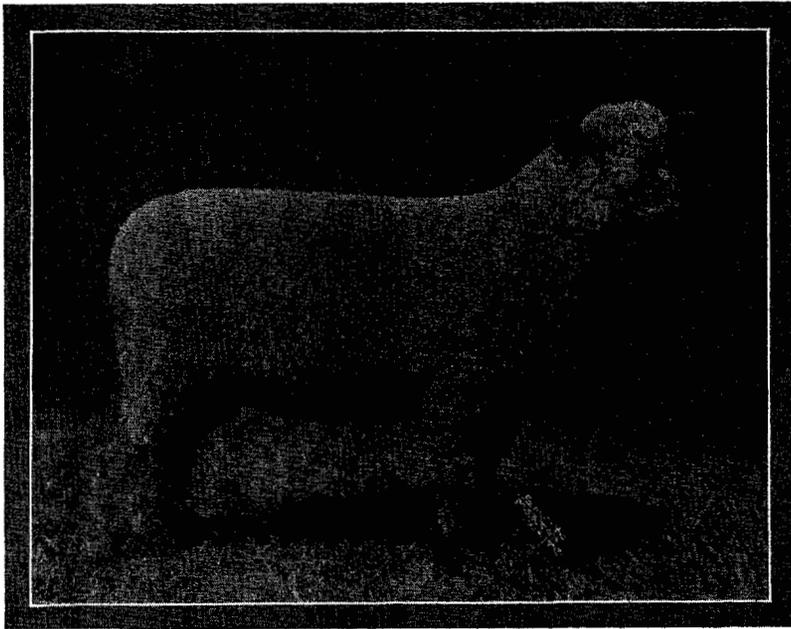


FIG. 7.—Oxford ewe.

The Hampshire, becoming in recent years more numerous than the Shropshire, has a very wide distribution and is making very rapid gains in both popularity and numbers. Its hardiness, early maturity, and thick-fleshing qualities, along with its size, make the Hampshire an admirable sheep for crossing on fine-wool ewes from the range country. The use of Hampshire rams in Kansas and the Corn Belt for siring lambs for the early market is becoming increasingly popular. The breed is very hardy and the rams have long been crossed on range ewes in the Northwestern range states, producing high quality blackface feeder lambs.

**The Oxford.**— The Oxford resembles the Shropshire, but is considerably larger and carries the coarseness which generally accom-

panies size. (Fig. 7.) The face and leg markings are brown, and it does not have the wool cap and leg covering of the typical Shropshire. The wool on the forehead grows to a sort of topknot.

The Oxford, besides being the largest of all medium-wool breeds, excels all of these breeds in quantity, but not quality production of wool. Twelve-pound fleeces may be expected from Oxford flocks. The wool should grade mostly low-quarter-blood or 46's and is always of combing length. They are very prolific and good mothers. Like the Shropshire, they are strictly a farm sheep and are not used by range breeders.



FIG. 8.—Dorset ram. (Champion as a lamb, Kansas Free Fair and Kansas State Fair, 1926. Bred and owned by Kansas Agricultural Experiment Station.)

**The Dorset.**—The Dorset is the only medium-wool breed in the United States having horns. (Fig. 8.) It is a little larger than the Shropshire in size, but does not conform to ideal mutton type as closely as the Shropshire. The distinguishing characteristics, aside from the horns, are their white faces and legs and pure-white fleeces.

Dorsets do not rank high in wool production, shearing about  $7\frac{1}{2}$  pounds of combing wool, grading  $\frac{3}{8}$  to quarter-blood or 48's to 56's. The ewes produce more milk than those of other breeds, and the birth of twins and triplets is common. Dorset ewes are the earliest breeders of all and will breed in the spring of the year to lamb in the fall, which makes them the most popular from the standpoint of

producers of "hot house" lambs. They are quite hardy and for lamb production are well adapted to Kansas conditions.

**The Suffolk.**—The Suffolk breed of sheep (Fig. 9) bears a considerable resemblance to the Hampshire. They are about the same size or possibly weigh slightly less than the Hampshires, but are large of frame and appear somewhat rangy. The head of the Suffolk and the legs below the knees and hocks have no wool on them as do those of the other breeds discussed, but are covered with black hair. This, together with the high carriage of the head, makes the Suffolk a very striking appearing sheep. They shear about the same amount and quality of wool as the Hampshire. Suffolks are noted for their



FIG. 9.—Suffolk yearling ewes. (Photo through courtesy of "The Farmer and Stockbreeder," London.)

prolificacy, hardiness, and fast-growing characteristics. Suffolk rams crossed on fine-wool range ewes produce meaty, uniform lambs that reach market weight early and usually sell at the top of the market. This and the popularity of Suffolks for crossbreeding in the range states have been the chief factors responsible for the rapid expansion of this breed in the United States. Producers of early lambs in Kansas could profitably use Suffolk rams to a greater extent than they do at present.

**The Cheviot.**—The Cheviot (Fig. 10) is one of the smaller mutton breeds. They are larger of frame than the Southdown but usually weigh no more. With their head and legs covered with white hair instead of wool and their erect head and ear carriage, the Cheviot is perhaps the most beautiful breed of sheep. They are prolific and hardy, and shear a good quality of all-white wool that is

in demand by woolen mill buyers. Cheviots are not numerous in the United States, although their number increased greatly between 1920 and 1940.

**The Lincoln, Cotswold and Leicester.**— The long-wool breeds have not been very popular in the United States, especially in Kansas. (Figs. 11, 12, and 2.) They are good sheep and have their place. In countries where heavy carcasses can be marketed to more advantage than American tastes will permit, they have proved profitable. In North America they are found chiefly in Canada. They have been used to some extent on the range.

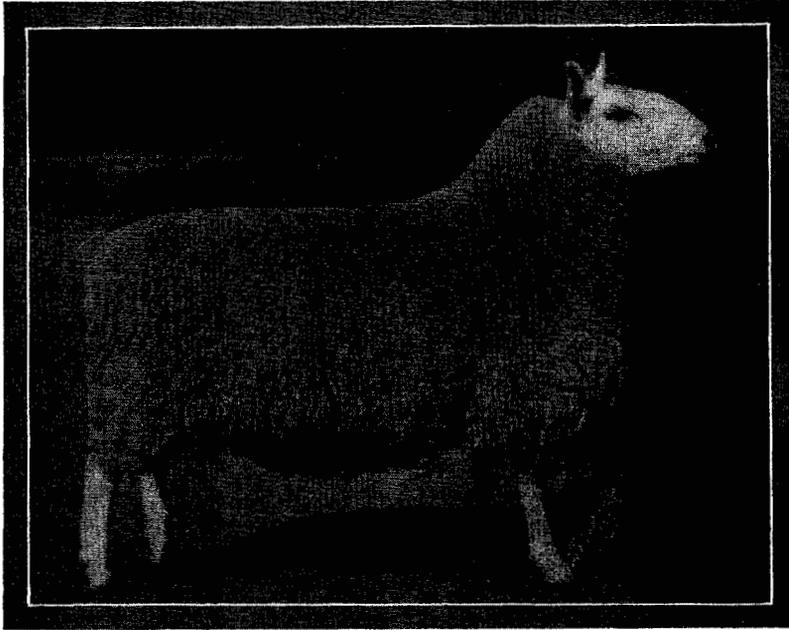


FIG. 10.—Cheviot ewe.

The meat from long-wool breeds lacks the quality and fine grain of dark-faced medium-wool breeds. They fatten well and make good gains in the feed lot, but the carcasses are often criticized for excess fat. When crossed with fine-wool breeds this objection is removed. All long-wool breeds are noted for their thickly covered, wide, strong backs.

**The Rambouillet.**— The Rambouillet (Fig. 13) fills an important place in the sheep industry of the United States being the most numerous of all the breeds in this country. They are indispensable in the range country. They have the flocking instinct which is necessary to herding in mountainous areas in order to prevent excessive losses from predatory animals. The dense oily fleece is not subject

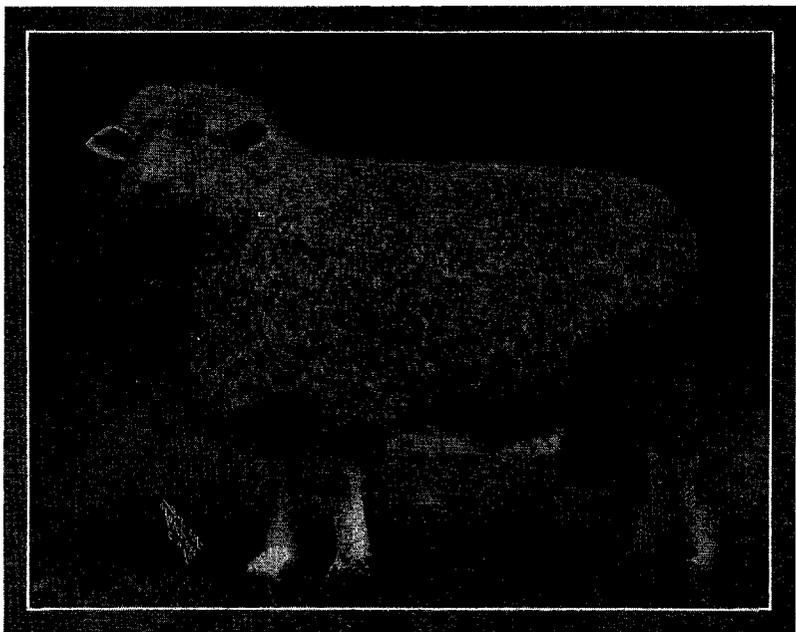


FIG. 11.—Lincoln ram.

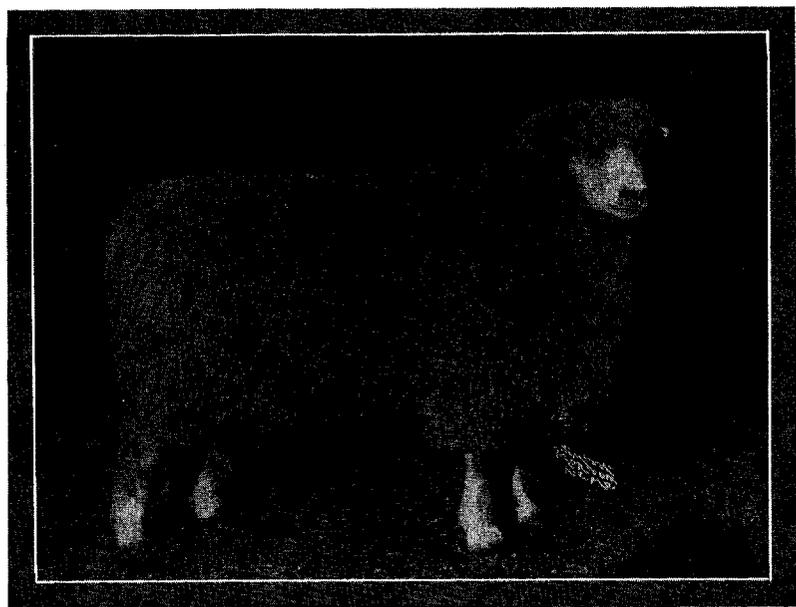


FIG. 12.—Cotswold ram.

to alkali injury on the range which would be very destructive to the wool of the mutton breeds. More important still they have the hardiness necessary to withstand rigorous climatic and feed conditions of the range.

Feeder lambs of Rambouillet breeding make up the majority of all of those coming into Kansas and other feeding states from the range. While on foot they do not have as good mutton type as the mutton breeds, the carcasses of well finished fine-wool lambs are difficult to distinguish from those of lambs carrying more mutton



FIG. 13.—Rambouillet yearling ram. (Stud ram in flock of Kansas Agricultural Experiment Station.)

breeding. Rambouillet ewes are the hardiest in existence and make up the great majority not only of the breeding stock of the range, but also of the ewe flocks of spring lamb producers in Kansas and elsewhere. They shear 10 to 15 pounds of fine wool, grading 64's to 80's. They lamb earlier than the mutton breeds except the Dorset, but are not prolific and may not produce more than 100 to 110 percent lamb crop. Their heavy wool yield and long life offset this handicap, however. Rambouillet rams should not be used to sire spring lambs.

**The Merino.**—The Merino is first and last a fine-wool sheep. Its function is the production of fine wool and it performs this function well. It has little or no claim to mutton qualities.

**The Breed for Kansas.**—As to which of these breeds is best, there is no best breed of sheep. Each breed has certain characteristics and adaptations which limit or favor its production under different conditions. Practically all market sheep are produced from grade flocks. According to the 1940 census reports less than 1 percent of the sheep in the United States are pure bred. The price of purebred ewes of any breed would, in general, prohibit their use in the production of market lambs. Purebred rams should always be used for spring market lambs. Which breed is best for this purpose would depend wholly on conditions. For Kansas conditions it seems that a ram of one of the middle-wool breeds crossed on native or western ewes offers the greatest possibilities.

### III. THE FARM FLOCK

The Kansas farmer starting in the sheep business has opportunities to purchase either native or western ewes. Regardless of the kind of ewes purchased, they should be obtained early enough to permit breeding for early lambs. Lambs born before March 10 are considered as early lambs. Lambs born after that date are late lambs. Early lambing in Kansas has distinct advantages. Late lambing necessitates putting lambs on the market in competition with the great run of range lambs, as well as finishing them under adverse conditions.

#### NATIVE EWES

When good native ewes are obtainable they make a good foundation for a farm flock. In spite of the fact that most of the native ewes in Kansas have poorer fleeces than the majority of range ewes, they are a more desirable mutton type. The greatest drawback to the purchase of native ewes for market lamb production is that if they are good, thrifty ewes, they cannot be bought so cheap as good western ewes. Quite often, when they can be purchased at a price which is reasonable, they are for sale because they are not making money for their owner. The great majority of natives, especially in the eastern part of the state, are infested with stomach worms.

#### WESTERN EWES

For Kansas conditions western ewes seems to be most advisable. (Figs. 14, 15, 16.) Western ewes can be obtained at a price that will permit them to be handled at a profit. Western ewes come in from the ranges comparatively free from internal parasites. The numbers of such ewes that are offered permit the purchaser to make a selection, and regardless of the number wanted, it is a tremendous advantage to be able to get the uniformity available in range ewes. They also live longer and produce more and finer wool than native ewes. They usually breed earlier than natives and are good milkers.

**Types of Western Ewes.**—So far as breed types are concerned, there are three distinct types of range ewes. Each one has certain advantages and disadvantages and no one type is best suited to all conditions and purposes. Often two or more sheepmen in the same community will be found handling different types of range ewes, and proving equally successful, while in other sections one type may predominate. The advantages and disadvantages of each type should be carefully weighed with the specific purpose for which they are kept and the prevailing conditions kept in mind when a selection is made.

**Fine-wool Ewes.**—Most ewes of this type are largely of Rambouillet breeding and the majority of them come from the south-western ranges. (Fig. 14.) They are often called "white face" ewes, but the term is somewhat confusing since there are other white face

ewes which are entirely different in breeding as will be described later. The outstanding advantages of this type of ewe are that they are hardy and vigorous in the extreme and therefore are able to withstand adverse conditions if necessary; they are also long lived and replacements need not be made as often as with other types. This is an advantage of considerable value over a period of years; fine-wool ewes are more uniform than cross-bred types, and they usually can be bought cheaper than blackfaces.

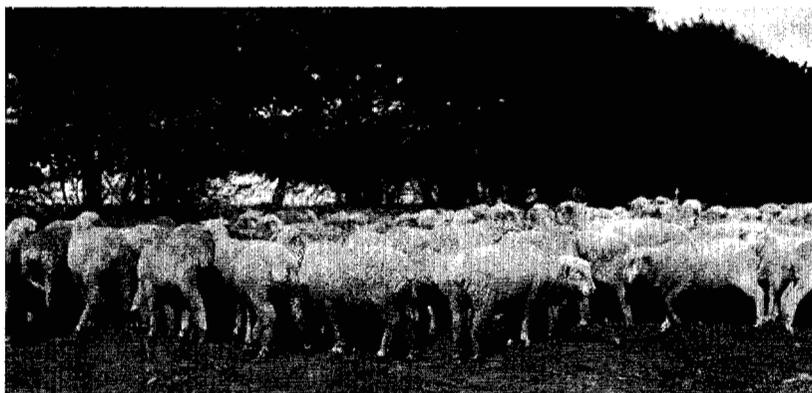


FIG. 14.—Fine-wool ewes. These are yearling grade Rambouillet ewes shipped into Kansas from the range in Texas.

Fine-wool ewes must be selected properly in order to have these advantages. Occasionally ewes of Merino breeding are bought in some range areas. They are excellent wool producers, but are small of frame and usually do not produce good spring lambs. Fine-wool ewes may be criticized for lack of size unless the larger ones are picked, and they are definitely less prolific than other types.

**Blackface Ewes.**—Range ewes of this type usually are a cross of Hampshire or Suffolk rams on fine-wool ewes. They may be the result of a second or third cross, in which case they are grade Hampshires or Suffolks, carrying some Rambouillet breeding (Fig. 15). They are frequently referred to as “Northwesterns” but this too is a misnomer since some Southwestern ewes are of this breeding now, and also since many ewes of types other than this come from the northwest. Their chief advantages are first that they are much more prolific than fine-wools. Lamb crops of 140 percent or more are not unusual for this kind of ewes. They are larger, have better mutton type and are excellent milkers. They are able therefore to raise their lambs well even though they have many more twins.

The wool clip from blackface ewes is lighter and of coarser grade than that of fine-wool ewes. Replacements must be made somewhat more often, and the initial cost of ewes of this type is higher since

they nearly always sell at somewhat of a premium over ewes showing poorer mutton type.

**Long-wool Type Ewes.**—Most range ewes carrying a cross of Romney, Lincoln or Cotswold on fine wool, or of Corriedale or Corriedale cross breeding are referred to in this category (Fig. 16). Often such ewes are called Corriedales, even though in some instances they carry little or none of this breeding. Like the black-faces the majority of them come from the northwestern ranges.



FIG. 15.—Blackface ewes (newly shorn). These ewes are the second and third cross of Hampshire and Suffolk rams on grade Rambouillet ewes. They are from Idaho.

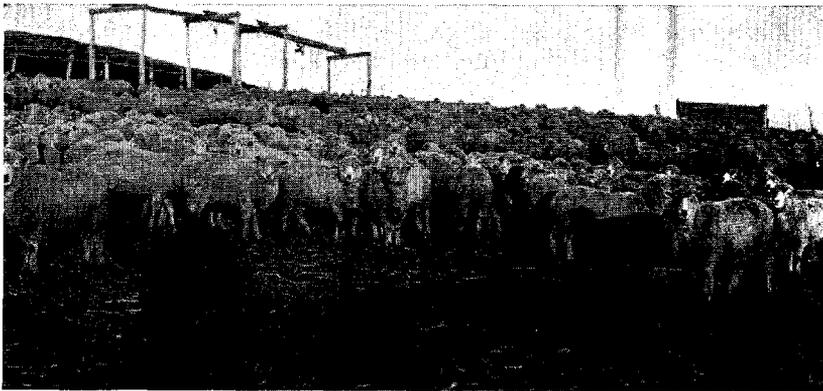


FIG. 16.—Long-wool type ewes. These ewes were produced in Wyoming by crossing Corriedale rams on grade Rambouillet ewes.

They are very large of frame, and because of this and their long staple wool, they appear much larger than the other breeds. They usually weigh no more than blackfaces, however, and perhaps less in most instances. They are very prolific and are good mothers. If ewes of this type carry more than 50 percent of long-wool breeding their lambs are likely to be coarse and not to finish at early ages, which would make them unsuitable for spring lamb production. If they are used in farm flocks, care should be taken to not use rams with too much ruggedness and size.

**Selecting Range Ewes for Soundness and Suitability.—**

Much more important than breed type in range ewes is the matter of selecting ewes that are sound and are good producers (Fig. 17). Many which are unsound or whose usefulness has been impaired are

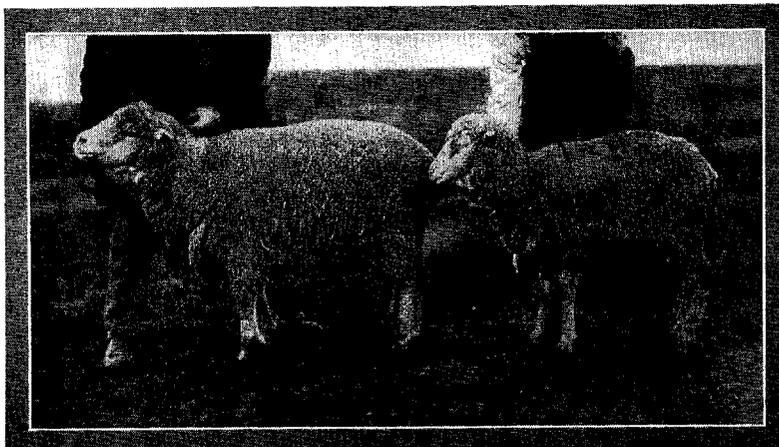


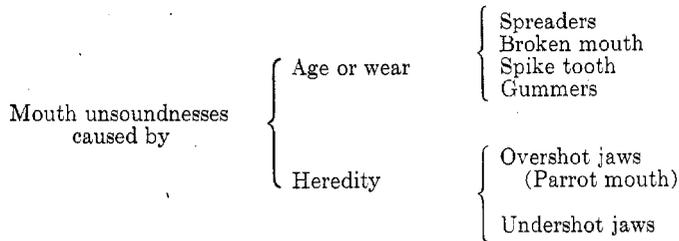
FIG. 17.—A western ewe of good type and conformation in comparison to a worn-out western ewe.

shipped from the ranges to the market each year, since they are no longer profitable to the range man. They should be left on the market and only those which have further usefulness left in them taken out on farms to produce spring lambs.

**Barren ewes** should be the first thing the prospective sheepman eliminates in sorting range ewes for farm flocks. Whenever a ewe fails to produce a lamb for any reason, or if she loses her lamb soon after birth, the range producer usually marks her for shipment later. In many instances beginners in the farm flock business have gone to market and sorted the barren and nonbreeder ewes out of a band of range ewes to take home, leaving the good producers on the market. Barren ewes are invariably the best looking ones, since the extra flesh they carry gives them the appearance of better mutton type. Ewes in good flesh should not always be condemned but the buyer should be suspicious of those which show much better flesh than the

average run of range ewes at that time of year. An udder examination will usually confirm the breeding status of a ewe, at least insofar as her production the past season is concerned. A ewe of breeding age which has lambed one or more times should show some udder development, with the halves of the udder distended somewhat, spongy to the touch, and the teats should be grown out well. One which has not produced will have small teats, and an udder which lies flat against the abdomen like that of a ewe lamb. A little experience comparing functioning and undeveloped udders is much better than description and will enable one to distinguish between them easily.

**Mouth unsoundnesses** are among the most common ones found in range ewes. There are two common causes of these unsoundnesses; age or "wear-and-tear" is one and heredity is the other. The following diagram will help to visualize the mouth unsoundnesses in their different stages:



Up to four years old the teeth are a good index of the sheep's age (Fig. 18.) After a ewe becomes a "full mouth" (four years or older) the first mouth condition usually which indicates advancing age is a "spreader" mouth (Fig. 19). This is caused by receding gums removing some support from the incisor teeth, allowing them to protrude at a greater angle and at the same time spreading part. The usefulness of "spreaders" is in no way impaired except that they have difficulty staying in good condition where grazing is the chief support.

**Broken mouths** (Fig. 20) usually show up as the next stage in the "mouth age" of a ewe. This may mean that some of the teeth are broken or that some may be missing and the set broken. There is no set age when ewes get a broken mouth. It depends some on the type of ewe but most of all on the treatment and conditions under which they have grazed. Blackface sheep carrying some mutton breeding usually become broken mouth before fine-wool sheep under the same conditions. Sheep grazing on grass covered ranges free from gravel, rocks and coarse vegetation may not develop broken mouths until they are eight to nine years old or older. On the other hand it is a common thing to find ewes from gravelly land where sage brush and other coarse vegetation cover the range, such as in the Red Desert area of Wyoming and other similar sections, with broken mouths at five or six years of age. Broken mouth sheep

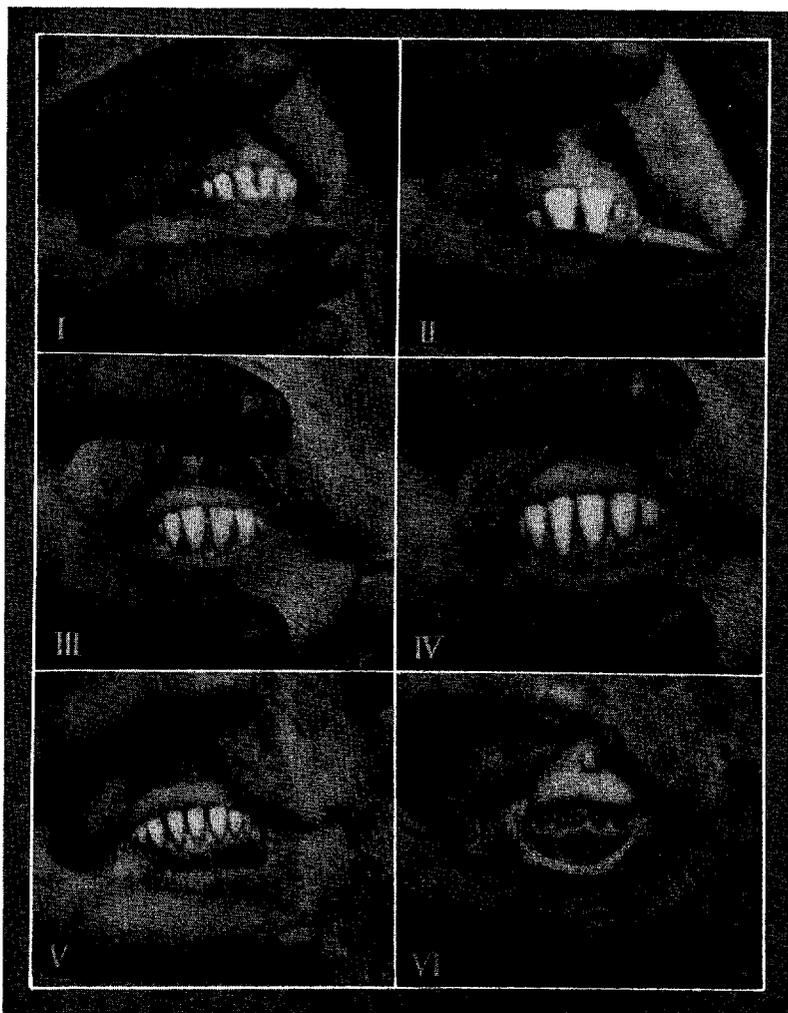


FIG. 18.—Photographs showing teeth of sheep. (I) A lamb's teeth. (II) Teeth of yearling. (III) Teeth of two-year-old. (IV) Teeth of three-year-old. (V) Teeth of four-year-old (full mouth). (VI) An old sheep's badly worn teeth.

have difficulty grazing, especially on fine and short vegetation such as Buffalo grass, bluegrass and short wheat pasture.

The **spike tooth** condition (Fig. 21) of a sheep's mouth may develop instead of a broken mouth, following it, or not at all. The incisors of a spike tooth ewe are useless to her and if she is bought, she may for all practical purposes be considered as a "gummer."

**Gummers** (Fig. 22) are sheep whose incisor teeth have all been shed, or have been worn off down to the gums. They are able to produce a lamb and nourish it only if fed good harvested feeds and can make little use of grazing as a means of support.



FIG. 19.—A "spreader." The condition of this mouth is really an advanced spreader stage, and illustrates the limited grazing ability of the animal with such teeth.

In buying breeding ewes, sheepmen should follow the rule that a ewe is just as old as her mouth. It is not the age in years that matters, but the age in condition of the mouth. Nine-year-old solid mouth ewes are "younger" from the service standpoint than six-year-old broken mouth ewes. Inexperienced sheepmen sometimes start with old ewes with the idea of getting their first experience on something cheaper, so each loss will be less severe. This is a mistake they should not make. Experience is valuable, but it comes too fast and is too varied with inexperienced hands lambing old ewes with unsound mouths. Lambing such ewes is a job for an experienced sheepman and they should be left to him. Some men

make a specialty of this business and there is no reason why old ewes cannot produce one or more lamb crops under good farm conditions at a profit if they are bought right in the first place and handled right thereafter.

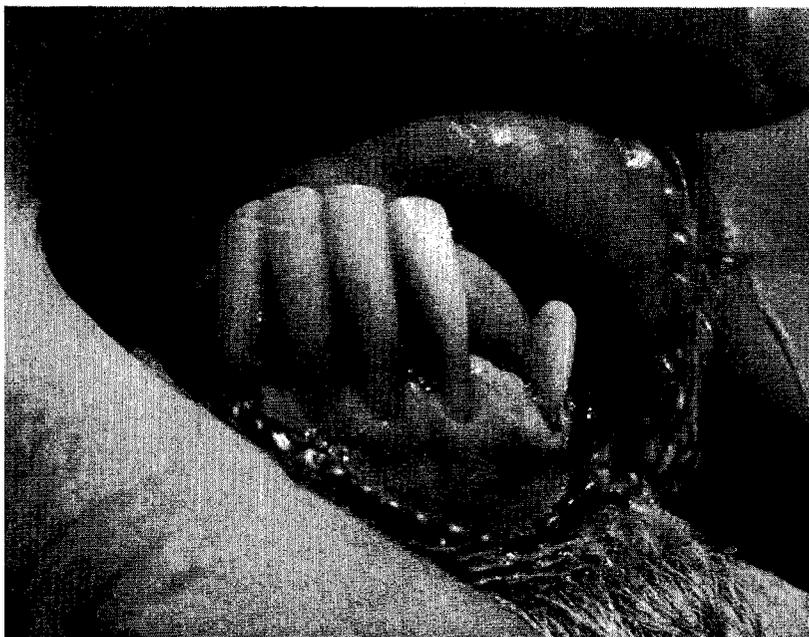


FIG. 20.—Broken mouth. In many broken mouths some teeth are broken, while in others some are missing, as shown here.

**Overshot and Undershot Jaws.**—Among the hereditary unsoundnesses of the mouth, overshot jaws (Fig. 23) are very common and undershot jaws but little less so. In the first case the upper jaw is too long, or the lower one too short, causing the incisor teeth in the lower jaw to miss the rubber-like dental pad against which they normally come into contact. The undershot jaw is just the reverse condition. In either case the ewe is unable to graze well, especially on fine forage and thus cannot stay in strong condition and milk well. This condition should be avoided carefully in selecting breeding ewes, and a ram with a mouth condition of either type will transmit it almost 100 percent to his lambs.

Udder unsoundnesses are common in range ewes, (Figs. 24 and 25.) In ewes two years old or older if the udder is sound, both halves should be even in size, soft, spongy, free from lumps and warm to the touch, showing that congestion has not destroyed the capillary circulation of the udder. Udders with broken support or which are ruptured should be avoided, as should also extra large teats. Yearling ewes should be examined for missing teats which may have been clipped off by careless shearers.



FIG. 21.—Spike tooth condition of sheep's mouth.



FIG. 22.—Gummer. This ewe has lost all of her incisor teeth.



FIG. 23.—Overshot jaw (parrot mouth).

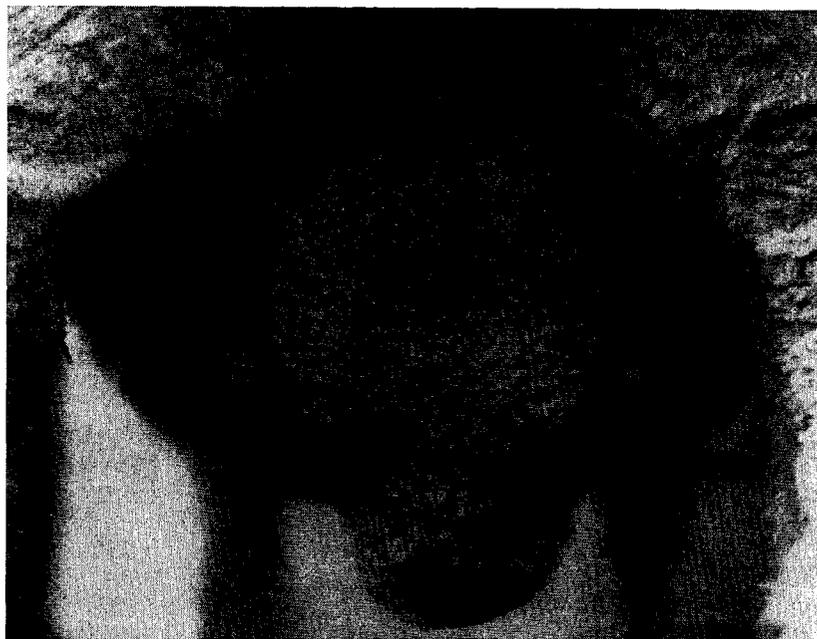


FIG. 24.—A "ruptured" udder.

**Ruptured** ewes are easily detected. They have a knot perhaps the size of the first on the lower side of the abdomen, where the musculature of the abdominal wall has broken apart allowing some of the viscera to buldge out. Such ewes require close supervision at lambing time and should be avoided.

It is well to remember that good range ewes are plentiful as a rule and that there is no point in taking out unsound ones for breeding. Ewes should never be bought on a "gate cut," or straight market run. It is more economical to pay extra for the privilege of examin-

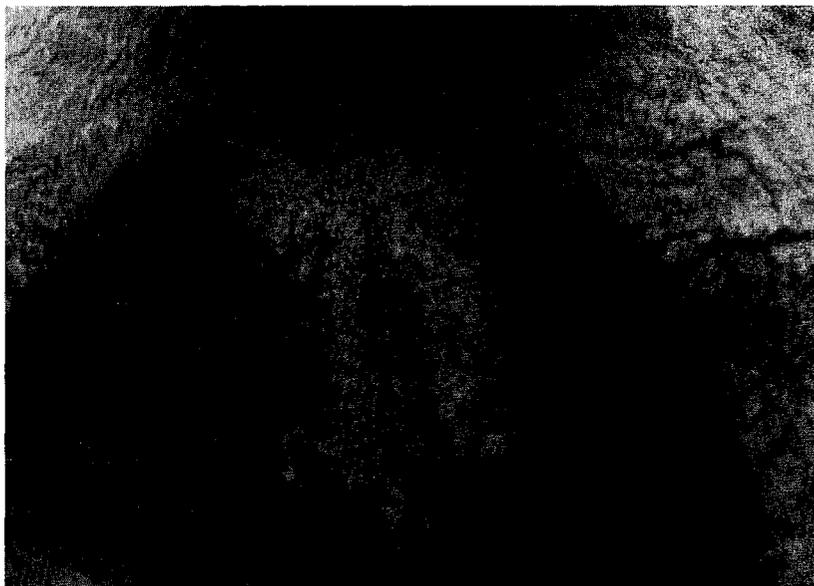


FIG. 25.—Spoiled udder. Ewes in this condition are liabilities as spring lamb producers.

ing each ewe individually and sorting out the undesirable ones. The majority of the sheepman's troubles are bought when the ewes are selected. Many of the unpleasant experiences of lambing in cold weather could have been avoided when the breeding ewes were selected the previous summer or fall. The discussion on selecting ewes may sound complicated, but if a beginner will follow the procedure carefully while actually sorting ewes, he will soon become proficient in distinguishing good ewes from poor ones. He can, in a short time, put two or three hundred ewes through the cutting chute, divided into bunches of widely different value to a farm flock spring lamb producer. He should also remember that there is nothing wrong with asking for advice and help in sorting from somebody who is experienced.

Two-year-old ewes which have lambed once and can then be sorted for soundness are perhaps first choice in value of all ages. Yearlings and three-year-olds would come second choice. Yearlings require more attention at lambing, produce fewer lambs the first year and some develop unsoundnesses and have to be culled. On the other hand they have two more years of their life before them than three-year-olds.

**Dipping Precautions.**— When ewes are purchased on the market or on the range they should be dipped before being shipped to their destination. All public yards and most range shipping points are equipped to dip sheep at a reasonable price. Such dipping vats use dips prescribed and approved by the Bureau of Animal Industry, United States Department of Agriculture, and the dipping is very cheap insurance against ticks, lice and contagious skin diseases.

When a contagious disease develops in a certain section of the United States, the Kansas state livestock sanitary commissioner establishes a quarantine against sheep from that section. They can be admitted to the state only after compliance with the quarantine regulations.

#### THE RAM

In selecting a ram for use on grade natives and western ewes a purebred ram of one of the mutton breeds should be obtained. Too much stress cannot be put on the qualifications of the ram. As a general rule western ewes will not have a very desirable mutton type, nor will they be uniform. Whatever the lamb possesses in the way of mutton type, natural thickness and feeding ability must come largely from its sire. Only a thick, tumpy, purebred mutton ram can be expected to so mark his lambs. In choosing a breed of ram some consideration should be given to the type of the ewes. If very large, coarse ewes are bought, then rams which are blocky and do not show too much ruggedness should be used, otherwise the lambs may be "horsey" as the market buyers say. On the other hand small, fine-boned ewes should be bred to rams with some size and ruggedness so the lambs will have sufficient frame to grow out and finish for the market at an early age.

**Good Rams Versus Poor Rams.**— The accompanying pictures (Figs. 26, 27 and 28), showing the contrast between good rams and poor rams and their offspring tell the story and show the advantages of a good sire. The lambs sired by the good rams had the type desired by buyers. They also had the ability to handle their feed so they went to market at approximately three months of age, weighing 72 pounds. On the other hand, the lambs sired by the poor rams had an undesirable type similar to that of their sires. They required a year's feeding before reaching a marketable finish and a weight of 85 pounds. The mothers of these lambs were from the same band of Utah ewes as the mothers of the good lambs.

**Where and How to Get Good Rams.**— Poor-grade rams can be purchased on the central markets for a few cents a pound. Usually

they are for sale because they are sterile, or siring a poor kind of lamb, or at least because someone else does not want them: No matter how little they cost they are the most expensive in the long run.

Good purebred rams can be obtained from reputable breeders. They are, as a rule, sold guaranteed as breeders, and a satisfactory settlement is made when they prove otherwise. The man who wishes to buy such a ram should place his order early, because the breeder who produces a desirable kind and guarantees them is generally sold out of serviceable rams long before the breeding season opens. Too often the producer of market lambs waits until the last moment before purchasing, and then has to take whatever is left and whatever he can find.

The objection of most farmers to early purchasing of the ram is that they have no place to put him except with the ewes. Breeders will hold rams until they are needed if the purchaser so desires. If a ram is to be shipped from a different climate or placed under widely different conditions it is a good plan to get him two or three months before the breeding season, so that he may become thoroughly accustomed to the change before the season opens.

**Age of Rams to Use.**—Yearlings are preferable when it is necessary to buy a ram. They are usually more vigorous and can be used for a longer time. Tried rams are desirable and can often be purchased at a bargain. As a rule ram lambs should never be used for service. In certain sections of the United States Hampshire ram lambs are used with considerable success. This will not hold true under Kansas conditions. Many breeders refuse to sell ram lambs because they do not feel that they can be guaranteed to do satisfactory service. Excessive service will retard the lamb's growth. His lambs will be small and weak, and it is very likely that many ewes will not settle to the first service. If used heavily he may not be a sure breeder in years to follow.

A ram over one year of age, when handled properly, should be able to serve 50 ewes.

#### CARE OF THE FLOCK

**When to Get Ewes.**—When ewes are purchased it is a good plan to get them as early as possible in July or August. This will give the owner plenty of time to get them in shape for the breeding season.

**Insuring Health.**—Where any symptoms of stomach worms are present the ewes should be drenched and rid of these parasites before they are bred, so that their strength may be used in nourishing their lambs. If ticks or lice are found the ewes should be dipped and sanitary measures taken to prevent a recurrence of them. If an inspection of the udders shows that they still have milk in them the ewes should be dried up as soon as possible. Shortly after a rain, or when the ewes have been running in mud, is a good time to

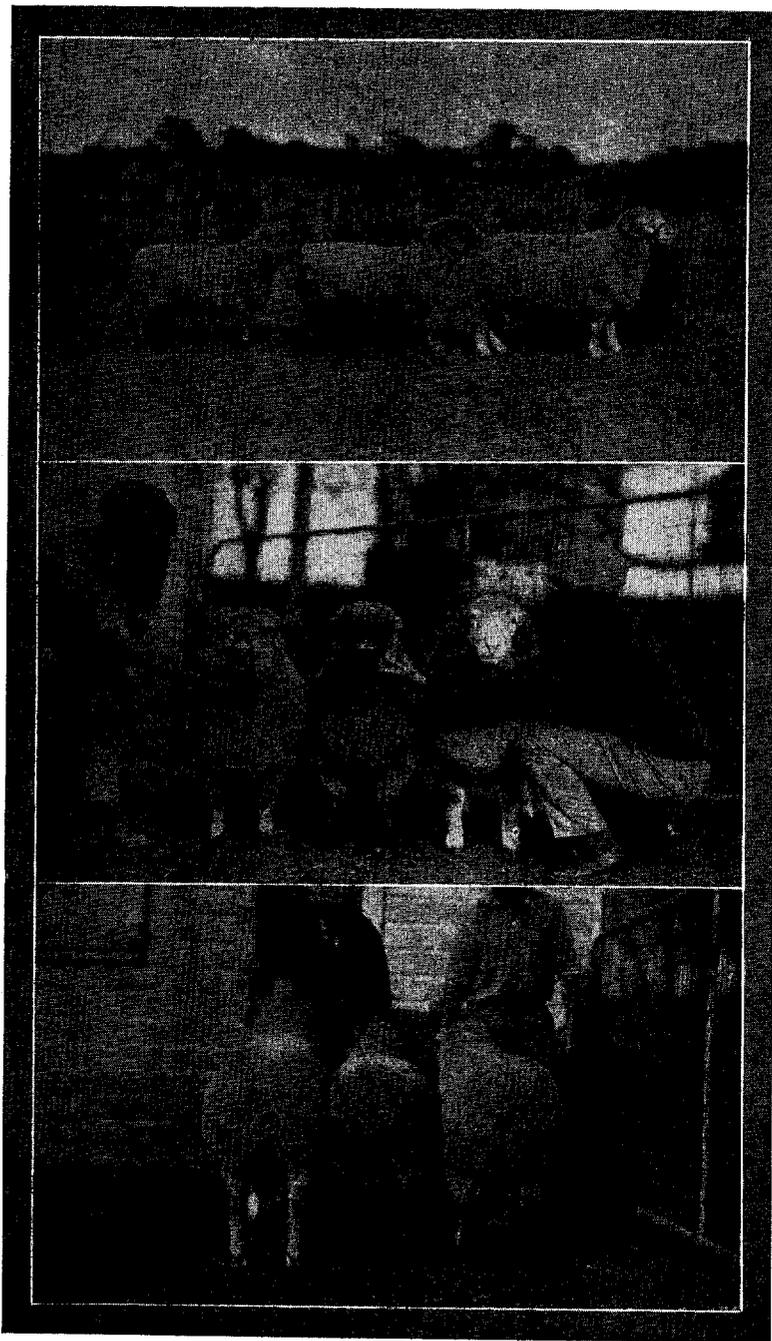


FIG. 26.—Good rams. (I) Side view, showing mutton type necessary in the sire of market lambs. (II) Front view, showing strong head and prominent forequarters indicative of masculinity and constitution. (III) Rear view, showing wide, thick loins, and deep, full legs, insuring natural thickness in offspring.

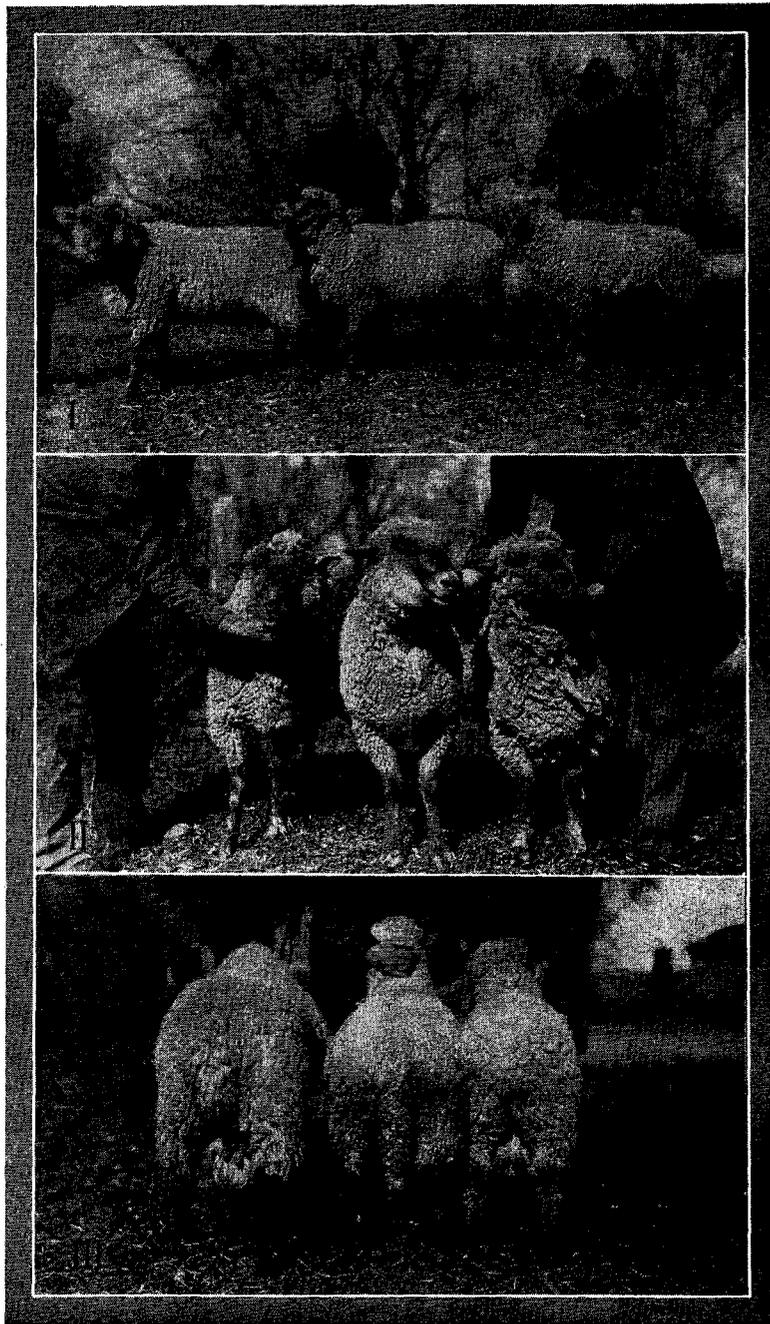


FIG. 27.—Poor rams. (I) Side view, showing leggy, shallow bodies. (II) Front view, showing long, narrow faces and pinched chests, indicating a lack of masculinity and vigor. (III) Rear view, showing a decided lack of development in the hindquarters.

go over them and trim their feet. (Fig. 29.) This will do away with the necessity of too much handling after the ewes become pregnant.

**Flushing.**— Flushing, or having the ewe gaining in flesh at the time she is bred, is considered an excellent practice by most shepherds. If a ewe is gaining in flesh, her organs, and especially her reproductive organs, are functioning normally, ovulation will be

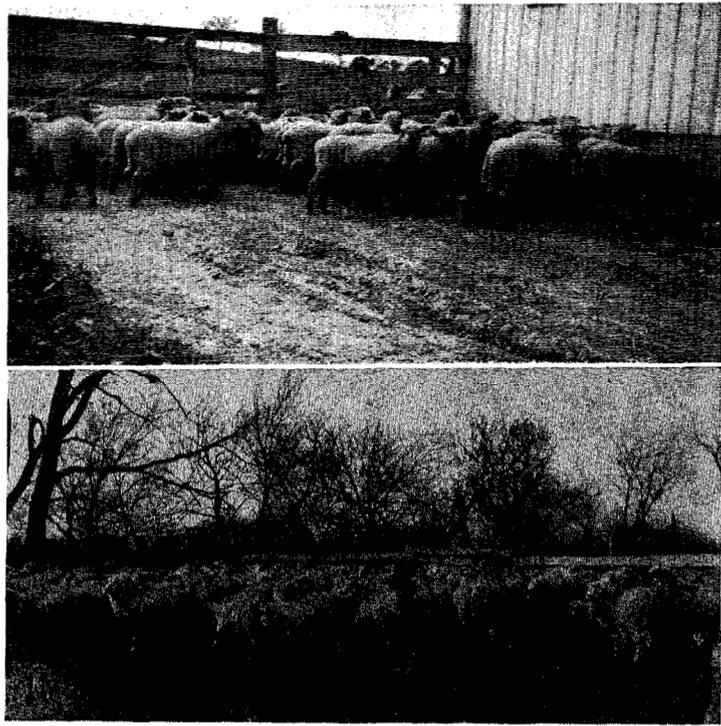


FIG. 28.—(I) Lambs sired by good rams. (II) Lambs sired by poor rams.

normal, more healthy eggs will be thrown off, and the possibility of the ewe producing twins, or at least thirfty lambs, will be greater. In all probability she will come in heat earlier and be more likely to settle to the first service of the ram. This will result in a more uniform lambing date and more uniform lambs at marketing time.

Flushing may be done by supplying new pasture for the ewes ten days to two weeks prior to breeding. When new pasture is not available flushing may be brought about by increasing the feed, adding good hay or a small amount of grain to the ration.

**Breeding Season.**—In Kansas ewes generally start coming in heat early in September. The first cool nights which usually occur at this time seem to be conducive to heat. Some ewes will come in heat in August, but they are few in number. More uniformity may be had if the rams are not turned with the ewes until September 1.



FIG. 29.—Feet showing a condition brought about by neglect.

Ewes kept in the hills or on high ground where the nights are cooler will breed earlier than those kept on low places.

The duration of pregnancy or gestation period in a ewe ranges from 147 to 153 days, approximately five months. February lambs therefore may be expected from September breeding. A ewe will remain in heat 2 days, and the period between heats varies from 16 to 18 days, but most often is 17 days.

**Trimming Ewes Preparatory to Breeding.**—Before the ram is let to the ewes it is a good plan to shear all wool and tags away from the dock and vaginal opening, so that there will be nothing to prevent the ram from serving the ewe. (Fig. 30.)

**Trimming the Ram.**—The wool should also be trimmed from around the sheath of the ram. Where severe weather does not set in until late in the fall the flock ram may be entirely shorn in early August, even though previously shorn in the spring. He will keep cooler and be more vigorous without his wool. Rams of those breeds which are heavily woolled about the head should have the



FIG. 30.—A ewe properly trimmed for the breeding season.

wool sheared away from their eyes, so that there will be no difficulty about their sight.

**Marking the Ewes.**—In order to know which ewes have been bred and also the date on which they were served the ram may be painted on the brisket. By this means the ewes which have been served can be easily seen. The color of paint can be changed each 17 days and those ewes which come in heat again can be found. Ordinarily paint is objectionable on wool because it cannot be easily scoured, and wool paint dries too rapidly to be used for this purpose. Lamp black, Venetian red, or other colored paint powders can be mixed with lubricating oil and satisfactorily used. Marks from these materials will have disappeared from the ewes by shearing time.

**Handling the Ram.**—In warm weather it is advisable to run the ram with the ewes only at night. By doing this the ram will be fresher when turned out and will not have to stand the heat of the day with the flock. When kept away from the flock during the day he can be fed nutritious feeds which would be too expensive for the entire flock. Some breeders find it advisable, especially when the flock is small, to turn the ram out with the ewes for only two or three hours in the cool of the evening.

**Feeding the Ram.**—For a few weeks prior to and during the breeding season the ram should be fed nutritious feeds. Oats is the best single grain for the ram. Where oats is not available, as is the case in many parts of Kansas, a suitable mixture can be made of corn 6 parts, bran 3 parts, and linseed oil meal 1 part, by bulk. The ram should receive from 1 to 2 pounds of this grain ration daily, the amount depending on his size and condition. When the ram is quite thin the proportion of corn in the ration should be increased. The grain sorghums may be used in place of corn.

In addition to the grain the ram should be allowed about 2 pounds of good hay, preferably alfalfa. Where possible he should have access to pasture.

During other than the breeding season every care should be taken to prevent the flock ram from getting fat. There is nothing that impairs the ram's breeding ability so much as excessive fat.

During the off season, except during the coldest part of winter, the ram can be kept in condition on pasture or forage. During severe spells in winter it is advisable to give him some grain.

**Exercise for the Ram.**—The ram should never be closely confined for long periods. He needs exercise to keep in good condition. It is better to let him run with the ewes throughout the year than to confine him.

#### FEEDING THE EWE FLOCK

**Considerations in Feeding.**—In choosing a method of feeding the ewe flock, one should first stop to consider why the ewe is being fed. The pregnant ewe should be fed for a threefold purpose.

First, she must maintain her own life. It will naturally require some feed to keep her vital organs functioning properly.

Second, she must have feed to permit her to nourish and develop the unborn lamb. Feed in excess of that required to meet her own needs will be utilized in the development of the lamb. If the feeds given the ewe are not the kind she should have to nourish the fetus properly, her own reserve will be drawn on. In such a case she will go into lambing time in a weakened condition and be unable to do a good job of mothering the lamb.

When a lamb is born it consists mostly of muscle and bone, with virtually no fat. Muscle is made up largely of protein. So the pregnant ewe requires a relatively large percentage of protein in her feed if her lamb is to be properly developed at birth. When leguminous hays make up the greater part of her roughage she is

able to obtain the necessary protein. When she is fed on carbonaceous roughages it is advisable to add linseed oil meal or cottonseed meal to her ration.

Third, the ewe should be fed for wool production. When a ewe is given only enough feed for her own needs and the development of the lamb, she will use part of it in growing a crop of wool. If strong, healthy lambs are had the ewe must have sufficient feed in addition to that required for herself and lamb to grow a crop of wool. Wool also requires protein, as it is of a nitrogenous nature, and a profitable crop of wool cannot be grown without protein. Any feed given the ewe in excess of these requirements will be used in laying on a reserve of flesh upon which she can draw later while suckling her lamb.

Many farmers desire to utilize as much coarse feed and roughage as possible in feeding ewes during the winter months. When ewes are fed only on cheap, coarse roughages they may have to eat so much to get the required nutrients that the overloading of their stomachs will have a bad effect on the unborn lamb. This may even cause abortion.

**Feeding During Pregnancy.**— After a ewe is bred, unless she is very thin,  $\frac{1}{2}$  pound of grain each day will be sufficient. An excellent grain ration for pregnant ewes is half corn and half oats. Any of the grain sorghums may replace the corn.

When alfalfa or other leguminous hays are fed a protein supplement is not necessary. When leguminous hays are not fed the addition of  $\frac{1}{4}$  to  $\frac{1}{3}$  of a pound of linseed oil meal will improve the ration.

Silage is a cheap succulent feed and may be used efficiently in feeding ewes so long as it is not moldy or frozen. It is not advisable to feed a ewe silage in excess of 3 pounds each day. Silage cannot be depended on for the entire roughage part of the ration. Dry roughage is necessary.

**Feeding During Lambing Time.**— Several days before a ewe lambs the feeding of bran will prove beneficial. Bran is a laxative feed and will “cool her out” and help put her system in good condition before lambing. For 16 hours after lambing the ewe does not need feed. Ewes showing evidence of being heavy milkers should have their feed reduced. In some cases it is advisable not to feed grain for a few days after lambing to avoid udder troubles.

**Feeding During the Suckling Period.**— After the lamb is born a ewe should be fed with the idea of furnishing milk for the lamb. She should not be fed large quantities immediately following lambing, as the small lamb cannot handle a great deal of milk. As the lamb grows and increases in size the milk flow should also increase.

The practice of fattening the ewes while they are nursing the lambs, with the idea of selling them as fat ewes immediately after weaning, is a very expensive procedure and seldom pays. A ewe cannot make economical gains if she is suckling a lamb. If she is a good mother and cares for her lamb as she should the greater part of her feed goes to making milk for her lamb. The low price that

is paid for fat ewes makes it impossible for suckling ewes to show a profit when fattened. When it is desired to sell ewes after they have weaned their lambs it is better to feed them for milk production and take a loss on the sale price rather than the greater loss which will come from the great quantity of feed required to make gains on such ewes. Furthermore, fattening rations are not conducive to high milk production.

**Feeding Ewes When Dry.**—After weaning the lamb the ewe may be expected to do well on pasture alone. For a short time scant pasture would be preferable to a rank growth as it will aid in drying up the ewe.

**Exercise.**—The cheap coarse roughages, such as cornstalks, kafir butts, and shredded fodder, have some value for feeding ewes. The

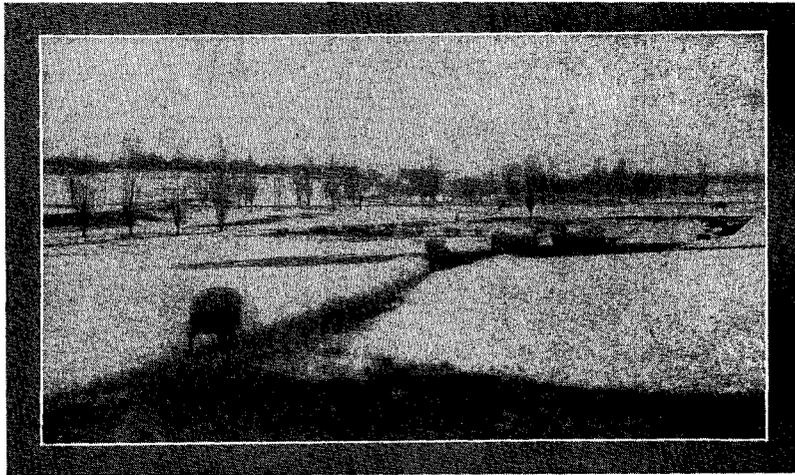


FIG. 31.—Snow paths for feeding roughage and insuring exercise.

value is due not so much to the nutrients contained in them as to their use in making ewes take exercise. Well-fed pregnant ewes are likely to get fat and lazy if they are not made to take exercise. Ewes seem to enjoy picking around, even when sufficient feed is given them. Roughages may be spread over the field, and the ewes will get the right kind of exercise in picking over this feed. Should they get lazy and refuse to pick around, the rest of their feed may be cut down or it, too, may be spread in the field. At the agricultural experiment station kafir butts are spread out for the pregnant ewes. They will strip the stalk of all foliage and finer vegetative growth.

During heavy snows (Fig. 31) paths may be made in the lots and field with a snow plow. The roughages can be spread along the paths and the ewes forced to get their exercise without floundering through the deep snow.

Many sheep men find it advisable to do the greater part of their feeding at a considerable distance from the barn. Such a practice insures exercise and keeps the ewes in good physical condition. One prominent breeder makes his ewes go three-quarters of a mile twice daily for their feed.

Exercise, though essential in keeping ewes in condition, should never be violent. Straining of any kind may cause the ewe to lose her lamb. Hence, the ewes should not be made to go through deep snows or mud. Neither should they be permitted to crowd through narrow doors and gates, nor to jump over high door sills while heavy with lamb.

**Water.**— It is desirable to have clean fresh water available at all times. Pregnant ewes nearing lambing time should not be made to drink icy water on account of the danger of chilling the fetus. Ewes are feverish at lambing time and attention to the water supply is important. They should not be permitted to fill up on a large quantity of water before or shortly after lambing. It is better to give them small quantities at frequent intervals. Extremely cold water is detrimental as it will tend to chill both the ewe and lamb.

**Suggested Rations.**— The following rations are suggested for ewes in various conditions as indicated:

**For Pregnant Ewes**

1. Alfalfa hay, clover hay, or sweet clover hay. Young healthy ewes will gain and give birth to strong lambs on alfalfa or sweet clover hay alone. The amount fed to them should be governed by the condition of the ewe. Pregnant ewes should not be permitted to get overfat. Old ewes and thin ewes should have grain in addition to the hay.
2. Alfalfa, clover, or sweet clover hay, 2 pounds daily. Pasture or run of cornstalks.
3. Grain,  $\frac{1}{2}$  pound. Alfalfa, clover, or sweet clover hay, 1  $\frac{1}{2}$  pounds. Pasture or run of cornstalks.
4. Grain,  $\frac{1}{2}$  pound; alfalfa hay, 1 pound; silage, 3 pounds.
5. Cottonseed meal or linseed oil meal,  $\frac{1}{3}$  pound; alfalfa hay, 1 pound; silage, 3 pounds.
6. Cottonseed meal,  $\frac{1}{3}$  pound; cane hay, 1  $\frac{1}{2}$  pounds; silage, 2  $\frac{1}{2}$  pounds; ground limestone,  $\frac{1}{2}$  ounce.

Any of the following grain mixtures will suffice: Oats 50 parts, corn 50 parts; or corn 60 parts, bran 30 parts, linseed oil meal 10 parts; or corn 50 parts, linseed oil meal 10 parts. Sorghum grain may be used instead of corn and in the same amounts with equal results.

**For Ewes Suckling Lambs**

1. Grain, 1 pound up, depending on the condition of the ewe and lamb she is suckling; hay, 2 pounds; silage, 3 pounds.
2. Grain, 1 pound up, depending on condition of the ewe and lamb she is suckling; hay, 1 pound; and pasture.

When pasture is available the silage may be taken from the

ration. When suckling ewes are turned on pasture it is advisable to continue the feeding of hay and grain. When the pasture becomes plentiful enough to furnish sufficient roughage for the ewes, they, of their own accord, will quit eating the hay. When lambs are to be crowded for market the ewes should have grain as long as they are nursing the lambs.

**For Dry Ewes**

1. Pasture alone. Scant pasture is preferable until the ewes are dry.

**LAMBING TIME**

**Precautions.**— Lambing time is the most critical time in the life of both the ewe and the lamb. Obviously it is a time when negligence will materially decrease profits. It may be possible for the shepherd to be careless in other seasons of the year and still “get by” after a fashion, but lambing time will not permit indifference in any way if a profitable crop of lambs is to be secured.

If the ewes have been cared for properly during their period of pregnancy, if they have been fed with the idea of nourishing the fetus and at the same time permitted to lay on a reserve of flesh to give them strength during labor and upon which to draw while suckling the lamb, if they have had enough of the proper kind of exercise to insure their being in a healthy condition, and if a strong, robust ram has been used, the shepherd may view the approach of lambing time with few misgivings. If these essentials have been overlooked trouble may be expected.

**Symptoms.**— Ewes about to lamb will sink away on each side of the rump and in front of the hips. The vulva will enlarge and take on a swollen appearance. Wax will form on the end of the teats, and milk can be drawn from them. As the time more nearly approaches, uneasiness and nervousness will be evident.

**Assisting the Ewe.**— Ewes in a thrifty condition will require little or no help during lambing. It is best not to assist them unless it is absolutely necessary.

**Cleanliness.**— Before attempting to assist a ewe the shepherd should wash his hands thoroughly and disinfect them in some mild solution. A mineral oil also carrying an antiseptic should be smeared on the hands to make it easier to insert the hand in the ewe. Where the case requires assistance the cause of the trouble should first be ascertained and help rendered on that basis. If the presentation is not normal the lamb should be pushed back into the uterus and its position readjusted.

**Presentations.**— The normal presentation of a lamb is with its forefeet coming together and with the nose resting on or lying between the forelegs. When difficulty is encountered from such a presentation it is usually due to the head or shoulders being too large to pass easily through the pelvic passageway. Help may be given by pulling outward and downward. Smearing oil or grease

on the vagina will facilitate the delivery. Every care should be taken not to tear or bruise the ewe.

One should never attempt to pull on a lamb until he is aware of the lamb's position. Both forelegs may be coming apparently normally, but the head may be turned back. The head and one foreleg may be presented with one leg folded back. The head may be presented with both legs back. The lamb may be in such an unusual position in the uterus that delivery is impossible until the lamb has been straightened. Lambs may be delivered without trouble, hindfeet first.

When pressure from labor has been so great that it is difficult to put the lamb back in the uterus for readjustment, the operation may be made easier if the ewe's hind parts are raised higher than her forequarters. When this is done the lamb can be pushed back into the uterus.

Operators with small hands have an advantage over those with large hands. Experience is the most valuable teacher in cases of this kind.

**Removing Membranes.**— The attendant should not try to pull the fetal membranes or afterbirth from the ewe after the lamb is born. In doing so they may be broken, or parts of them retained. The ewe should be allowed to throw them off herself.

When the ewe does not clean herself readily or bleeds, or has a bad odor from her uterus, it is advisable to flush her with a mild disinfectant. A salt solution made by dissolving one teaspoonful of salt in a quart of water which has been boiled and then cooled is very good for this purpose. A rubber tubing may be inserted into the uterus and the solution poured into a funnel in the other end of the tubing. When the solution does not go down, slowly raising and lowering the funnel will cause it to do so. When the ewe has been flushed out a few times any of the placenta or membranes which she has retained will usually be discharged.

**Helping the Lamb.**— After the lamb has been delivered any membranes which are about the head and nostrils should be removed. The fingers can be slipped into the lamb's mouth and any mucus found there removed. If the ewe is not completely exhausted from her labor the lamb should be placed at her head. She will lick the lamb dry and it will soon be ready to nurse.

**Lambing Pens.**— Ewes and lambs should, if possible, be placed in lambing pens immediately after lambing. These pens can be easily made with two panels or hurdles. Two panels, 4 feet long, hinged together and placed in a corner make an excellent pen. The pen makes it possible to avoid any disturbance from the rest of the flock and the possibility of the lamb getting away from its mother and being disowned.

Ordinarily ewes with single lambs, or older ewes having plenty of milk need not be put in the lambing pen. Young ewes which are nervous, or ewes with twin lambs or weak lambs should be put in the

lambing pen. In no case should ewes be put in the lambing pen before lambing unless an attendant is with them constantly. Even then it is best to wait until after they have lambed.

**Chilled Lambs.**—In extremely cold weather it may be advisable to help the ewe dry the lamb and start circulation by rubbing the lamb with warm cloths. Chilling may be avoided by wrapping the lamb in a warmed burlap sack before placing it at the ewe's head. A chilled lamb should be taken to a warm room and thoroughly warmed before returning it to the ewe. Lambs should not be kept from the ewe for long periods, as the ewes are apt to disown their

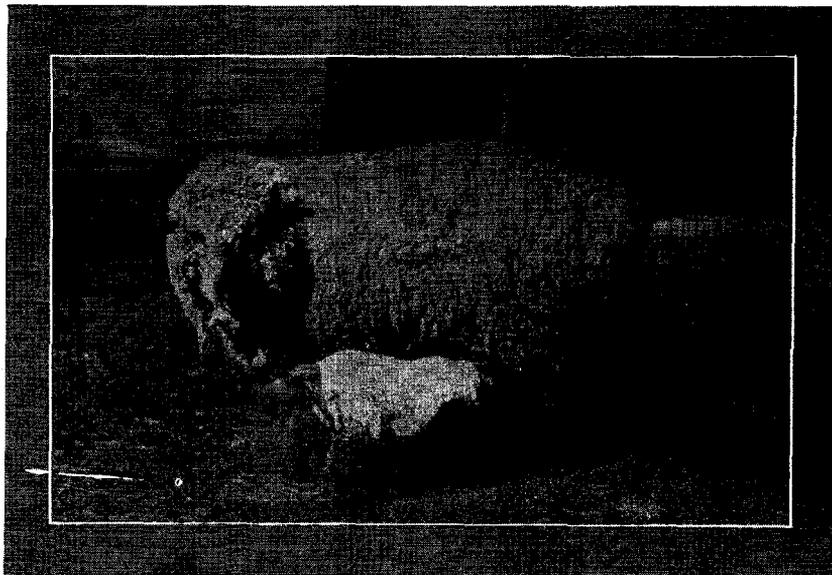


FIG. 32.—A dead lamb's pelt on an orphan lamb.

lambs. An old blanket thrown over the lambing pen will help keep in warmth when a ewe is going to lamb on a very cold night.

**Nursing the Lamb.**—A strong lamb will nurse without help, but weak lambs may require assistance for the first few times. It is essential that the lamb get the colostrum or first milk of the ewe. This colostrum is laxative and is necessary to clean the lamb of the fecal matter accumulated during its fetal life. When a ewe dies before the lamb can get the colostrum, the lamb must have castor oil if it is to be saved.

**"Pinning."**—The first feces that come from the lamb are quite sticky. They will stick to the lamb and become hard so that it will be impossible for further movement to take place. These may be removed and no more trouble expected from this source.

**Sore Eyes.**—Little lambs are often bothered with sore and irritated eyes. A saturated solution of boric acid may be dropped into the eyes twice daily. A 10 percent solution of argyrol is more effective but also more expensive.

Sometimes the eyelid on little lambs is turned under, resulting in irritation. Some authorities recommend sewing the eyelid back. When such cases are found at this station the eyelid is held in place with the fingers and adhesive tape put on so that it will remain in place. In a couple of days the eyelid will stay in place without the tape.

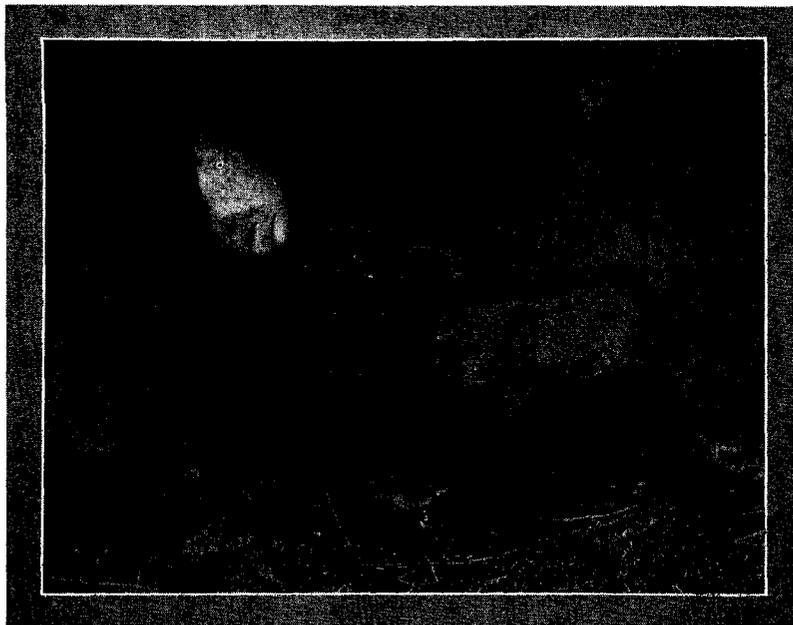


FIG. 33.—Feeding time for the orphan.

**Crooked Legs.**—Sometimes lambs are so weak in the legs that their pasterns will not be straight. Splints can be bandaged on, using cotton between the splints and legs to prevent stopping the circulation. In a few days the legs will straighten up so that the splints will be unnecessary.

**Navel Troubles.**—Lambs are not so subject to navel infection at birth as other young animals. To avoid infection the navel cord may be painted with iodine.

**Orphan Lambs.**—One of the troubles shepherds face at lambing time is orphaned and disowned lambs. Disowned lambs may be expected from ewes which do not have milk for their lambs and from

ewes whose lambs get away from them for long periods shortly after birth. Since ewes recognize their lambs only by smell, part of this can be overcome by sprinkling some of the mother's milk on the lamb and some on the ewe's nose.

Persistent and patient effort on the part of the shepherd will enable him to make a ewe which has lost her lamb mother another lamb. When a lamb dies its pelt may be removed and placed on an orphan, twin, or other lamb which it is desired that the ewe adopt, and she will often accept it as her own. (Fig. 32.) The pelt should not be left on the lamb for a long time, due to the danger of infection.

At the Kansas Agricultural Experiment Station a very heavy-milking Dorset ewe and a Southdown ewe each had twins within five minutes. The Southdown was old, thin, and sick, and had no milk for her lambs. Because of her breeding and the breeding of her lambs it was desirable to save them. Consequently the Southdown lambs were rolled and soaked in the afterbirth of the Dorset'. The Dorset accepted them as her own and mothered the four lambs for several days until other fresh ewes could be found to care for the Southdowns.

Orphan lambs can be raised on cows milk successfully. (Fig. 33.) Even though ewe's milk differs in composition from cow's milk, the latter needs no alteration. Cow's milk should be warmed to body temperature and given in small amounts but often. Sometimes it is advisable to add a small amount of lime water to the milk to sweeten the lamb's stomach. The bottles and nipples should be kept clean or digestive troubles will result.

#### FEEDING LAMBS

**Milk.**—Ewe's milk is the best feed that can be provided for lambs. However, lambs cannot be made ready for the early market on milk alone. They will require additional feed.

**Creeps.**—Little lambs will start nibbling at feed by the time they are two or three weeks old. The most satisfactory way to feed them is to provide a creep. A creep can be provided cheaply and easily by nailing some slats preferably one by fours, on horizontal two by fours. (Fig. 34.) The slats should be spaced so that the lambs may enter the creep but their mothers cannot. The creep should be placed close to where the ewes are fed. Little lambs do not like to get far away from their mothers. Neither do their mothers like to have them too far away. When the creep is some distance from where the ewes are fed lambs are longer in finding the feed and do not eat it readily.

**Grain.**—Grain for lambs up to eight weeks of age should be ground, after which whole grain will suffice. A mixture of ground corn, ground oats, and bran is a good feed to start little lambs. The corn may be gradually increased and the oats and bran eliminated if the lambs are intended for market. Corn 6 parts, linseed oil meal

1 part, is a very good grain ration for fattening little lambs. The grain sorghums or ground barley may be used in place of the corn.

**Hay.**—The lambs will eat a great deal of hay, and it should be kept before them in the creep at all times. Leafy leguminous hays are best for this purpose. Fourth and fifth cuttings of alfalfa make excellent hay for little lambs.



FIG. 34.—A satisfactory lamb creep.

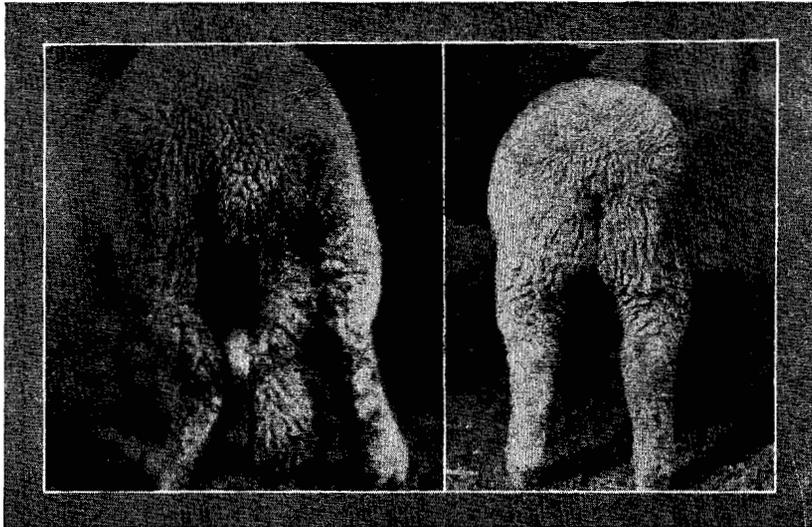


FIG. 35.—Undocked and docked lambs.

DOCKING AND CASTRATING LAMBS

**Docking.**—Some time between the age of two weeks and one month all the lambs should be docked. The docked lamb does not run the danger of having his tail weighed down or infected from an accumulation of filth. Docked lambs are neater and tidier in appearance than undocked lambs. (Fig. 35.) This fact will appeal to packer buyers who naturally figure the tail as so much waste. The docked lambs bring a higher price than undocked lambs, and the saying “Dock your lambs or the market will” is only too true.

**Docking with a Knife.**—Docking is a simple operation. The tail may be cut off at the desired length with a knife. When this procedure is followed the lambs should be closely watched so that they do not bleed profusely. Many little lambs bleed to death, or at least until they are quite weak, from this method of docking. If the tail is cut off when the lamb has considerable size, it is advisable to tie a string around the tail before cutting to prevent excessive bleeding. The string should be removed as soon as the danger of bleeding is over and the blood is clotted. If the string is left on longer the stub will become sore and inflamed.

**Docking with Hot Iron.**—An excellent method of docking lambs is to sear the tails off with a hot iron. Commercial docking pincers (Fig. 36) are used by many. However, it has been found that a heavy docking chisel (Fig. 37) which can be made at a low cost, is a much better instrument and does a better job of docking. The chisel should be made about four inches long by three inches wide by one-half inch thick, with a three-fourths-inch bevel on one end. It will then hold sufficient heat to dock 20 or 25 lambs while another chisel is heating. A board  $\frac{1}{2}$  to  $\frac{3}{4}$  inch thick with a hole through which the tail of the lamb can be placed to burn it off, should be provided. A small block flush with one side of the hole immediately below it is needed against which the iron can be brought in a shearing action. The board prevents burning the lamb and also gauges the length of the docks so they will be uniform.

The chisel should be heated to a dull red, but not any hotter. The operation should be about one-half cut and one-half burn in removing the tail. Too hot an iron or taking too long for the operation will result in a deep burn which will be slow to heal. The advantages of this method are that no bleeding occurs, and the wound is disinfected automatically so infection seldom results. There is much less danger of tetanus or other infection getting started than when a cut is made and an open wound remains.

The Burdizzo type instrument (Fig. 38) (emasculator) is used by many for docking but probably has no advantages over the other methods described.

**Castration.**—Ram lambs are even more objectionable on the market than long-tailed lambs. Ram lambs over five months old take on a more or less “bucky” appearance and their carcasses carry



FIG. 36.—Docking with pincers. (I) Applying the pincers at red heat. (II) The board prevents burning the lamb. (III) Searing prevents loss of blood.

to some extent the buck characteristics of texture and color. Ram lambs do not fatten so readily as wether lambs and are a great nuisance in a bunch of lambs being fattened.

When castrating the lamb is held as in docking. The operator should have his hands and knife clean and disinfected. The scrotum is then washed in a weak solution of one of the coal-tar dips, and the lower third of the scrotum is cut off. The testicles are then

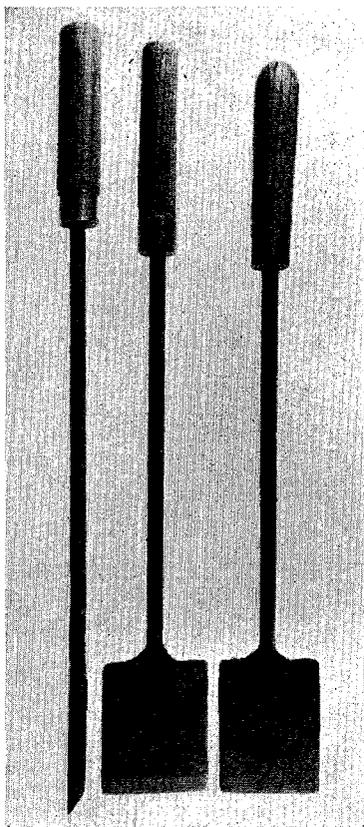


FIG. 37.—Home-made docking chisel  
 (side, front and back views).

removed by pulling them out, bringing with them as much of the cord as possible. The testicles may be pulled out by pinching on the cord between the thumb nail and forefinger. After removing the testicles the scrotum and surrounding parts should again be thoroughly disinfected. (Figs. 39 and 40.)

**Precautions.**— When docking or castrating it is better to do the work on a bright, clear day in order to avoid complications from

cold or chilling. It is also well to remember that the lambs should be handled as little as possible during the operation, to avoid exciting them. Increased circulation will result in greater loss of blood. After either operation the lamb should be put down immediately and kept as quiet as possible until all danger of bleeding has passed. When the work is done in the morning one has ample time to see that all bleeding has stopped before night. The younger the lamb the less likely is the trouble from bleeding.



FIG. 38.—Docking lamb with the Burdizzo type emasculator.

In some flocks these operations are performed at the same time. In others a week or more elapses between the operations. The best time will depend on the operator and the prevailing conditions.

After lambs are castrated they should be put in a pen bedded with clean straw and allowed to lie still for a while. After 15 to 20 minutes they should be moved around a little so they do not become too stiff.

#### WEANING LAMBS

In some flocks the lambs are weaned when they are sent to market. In some they are weaned, fed for a while, and then marketed or kept in the flock. Some farmers let the ewes themselves wean their lambs.



FIG. 39.—Castration. (I) Disinfecting hands and knife. (II) Disinfecting scrotum. (III) Cutting off lower third of scrotum.



FIG. 40—Castration. (I) Grasping testicle with thumb and forefinger. (II) The testicles removed. (III) Disinfecting scrotum and surrounding parts.

Lambs may be weaned by the time they are three and a half months old. When they are taken away from their mothers they should not be permitted to come back and nurse out the udder. When this is permitted the second parting is just as hard on the mother and the lamb as the first one.

Lambs that have been taught to eat at creeps will suffer no hardships from being weaned. The feed of the ewe should be reduced or she should be put on a scanty pasture until the milk flow has ceased.

To avoid udder troubles the ewes should be milked out every two or three days until they are dry. It is not advisable to take all of the milk, but just enough to avoid congestion and caking of the udder.

#### SHIPPING TO MARKET

**When to Ship.**—The Kansas farmer who is raising spring lambs should by all means get his lambs ready for market before the great run of western lambs dominates the market. The man who has good stock, lambs his ewes early, and feeds properly will have no trouble in getting his lambs to market by early June.

**Stock Cars.**—The sheep man who has enough lambs to use the railroad in getting them to market is fortunate. A double-deck stock car will easily hold 250 lambs. A single-deck or ordinary stock car will accommodate 125 or more.

**Pooled Shipments.**—Few flocks in Kansas are large enough to utilize a stock car. In some communities where a number of farmers have small flocks, the lamb crop is shipped together. The lambs from each flock are marked in a certain way so they may be identified and sorted at the market. This method of marketing is satisfactory.

**Trucking.**—Where the distance from the market will not prohibit, many flock owners have found it profitable to truck the lambs in as they reach a marketable weight and condition. Double decks may be easily built for hauling lambs in trucks. A one-ton truck, double-decked, will accommodate about 30 lambs.

**Accompanying the Lambs to Market.**—Regardless of the method of shipping a great deal can be learned about market requirements of stock by accompanying them to market. When on the market the owner can see where his stock is lacking, to what the buyer objects, or commends, and compare his own with the market tops. The successful handling of a flock of sheep requires a knowledge of current market demands. It also requires a willingness to cater to these demands, so long as these demands do not interfere with economical production.

#### SHEARING

**When to Shear.**—The time to shear sheep in Kansas will depend on prevailing weather conditions and housing facilities. Shearing is usually done between the middle of April and the middle of

May. By the middle of April the weather is such in most parts of the state that shearing may be done. When one has ample shelter for his flock it may be advisable to shear slightly earlier in certain sections. As spring comes on, sheep will do better when shorn. There is no advantage in letting sheep go until later in order to have an excessive amount of grease in the wool. However, some new yolk in the wool is necessary for easy shearing. It should be allowed to flow out one-fourth inch to one-half inch so the shearing comb does not gum up. The yolk also gives the wool more luster and makes it softer and more marketable. A week or 10 days of warm weather and some new green pasture will cause the yolk to begin to flow. Sheep that are not shorn suffer from the heat and cannot be expected to do well in the hot summer months.

If sheep are not shorn by fly time, maggots are quite likely to muse trouble where the wool is fouled. It is not a good plan to shear ewes that are heavy with lamb. At this station all lambs that are to be retained in the flock or exhibited at the fairs in the fall are shorn to their pelts in June.

**Hand or Machine Shears.**—Machine shears are used far more extensively than hand shears. More sheep can be shorn with them in a given time and a smoother job can be accomplished. To meet the objection that machines shear so close that sheep are likely to sunburn, combs have been devised which will leave up to a quarter-inch of wool on the sheep. When shorn with such combs, the job is just as smooth, and shearing may be done earlier, as the sheep are less likely to chill. Combs are also made which cannot cut the skin.

Machines can be obtained that run by hand power, electric motor, or gasoline engine.

**Care Before Shearing.**—Shearing can be done more easily on a warm day. Heat makes the grease or yolk in the wool run so it is more evenly distributed throughout the fleece. In cold weather the grease does not run and makes shearing more difficult by clogging the combs. Sheep should be thoroughly dry when shorn. Wet fleeces tend to mold. Sheep should not be fed before being shorn. If their paunches are not full at the time they are shorn the necessary handling is not so hard on them.

Shearing can be made easier by arranging a small pen next to the shearing floor. The sheep which are not shorn can be kept in the pen and may be caught easily and with little excitement.

**The Shearing Floor.**—A clean floor, preferably of boards, should be used for shearing. Shearing on the ground, or in litter, works considerable dirt, chaff and other foreign matter into the wool. This will greatly reduce the value of the wool. The floor should be swept frequently during shearing.

**Learning to Shear.**—It is practically impossible to explain the procedure of shearing in writing, but it is quite easy to show how it is done. The best thing for the beginner to do is to watch someone

shear who knows how. Ease in shearing will come only with practice. Even though a man has only a few sheep he should know how to shear them. There are too few custom shearers in Kansas, and if one does not shear his sheep himself he may have to wait until late in the season to get this work done.

In shearing, the sheep is set up on its rump, its back resting against or between the knees of the shearer. The sheep should be tipped backward far enough to keep its hind feet from resting on the floor. This will prevent struggling to a great extent. Different shearers have different systems of taking the wool off. Most of them take the wool from the brisket first, then on down the belly. The neck and head are sometimes shorn next but usually not until after the sheep is "crotched out" and the left side shorn. With this much removed the wool on the sides and back is then removed with long, sweeping strokes.

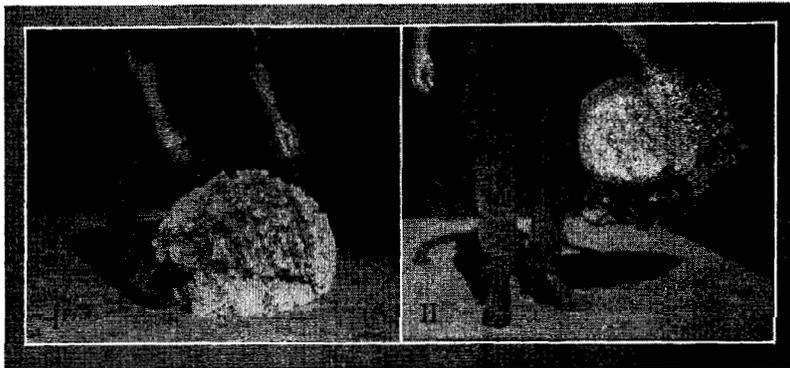


FIG. 41.—(I) Tying the fleece. (II) The bundle ready for sacking.

It is desirable to take the fleece off in one piece, and not to pull the fibers apart. This makes it easier to tie the fleece after it is removed. In shearing one should be careful not to cut the sheath on rams or wethers, and the udder and teats on ewes.

**Tying and Sacking the Wool.**—Paper twine or twine made especially for tying fleeces is the only kind to use in tying up the wool. Binder twine should never be used, as the sisal fibers stick to the wool and lower its value.

In tying the wool the fleece should be folded into a bundle with the skin side exposed and with the fleece rolled from the tail end toward the front. The bundle is then wrapped once each way with the paper twine and tied. (Fig. 41.)

Wool boxes, used for making tight, compact bundles of the wool, are objected to by graders. Most wool pools recommend the looser bundle. Graders prefer it because the fleece is more easily examined.

For shipment the fleeces are packed tightly into wool sacks. Wool

sacks are made of burlap and are 7½ feet long and 40 inches wide. They may be obtained from pools, wool commission firms and stockmen's supply companies. Each sack will hold from 225 pounds of wool up, depending on how tightly it is packed. Three hundred pounds of fine wool can be put in a seven-foot sack.

Wool of the same grade should be sacked together. Tags, wool from dead sheep, black fleeces, and fleeces of low market value, due to burrs or other foreign matter, should be sacked separately from the good wool.

**Marketing Wool.**—Kansas wool is marketed in three different ways. It may be sold to local wool buyers or representatives of wool commission houses. The bulk of it has been marketed in this way in years past, but more recently this method has declined in popularity.

Cooperative marketing of wool has made great strides in recent years and at present a large percent of Kansas wool is sold this way. By this method the wool is shipped to the government sponsored cooperative warehouse, usually after pooling at country points into carload lots. When it arrives there it is graded and an advance payment representing 65 to 75 percent of its value is made to the grower. The wool later is loaded into carload lots of the same grade and eventually reaches the Boston market where it is sold by the National Wool Marketing Corporation, of which the aforementioned cooperative is one of many member organizations. Final settlement is made to the grower on the basis of this sale, after deducting the handling and selling charges and freight.

Wool lends itself especially well to this kind of marketing. It is more nearly nonperishable than most farm commodities. Furthermore, there is considerable advantage to selling it in large quantities of the same grade which would not be possible for each small farm flock producer to do individually.

A third method which has come into use more in recent years has been the auction method, patterned after the English and Australian system of selling wool. By this method the wool is accumulated at a concentration point, where it is graded and sold with other lots of wool of similar grade, or it may be sold as a separate lot if the grower prefers. An auction is held at specified times and mill buyers bid in the wool. A commission is charged for the service. There has been an increased tendency especially for large operators to sell by this method in recent years.

### CULLING THE FLOCK

A poor sheep eats as much and costs as much to keep as a good one. The good ones, and not the poor ones, return a profit. After the flock has been shorn in the spring it is a good plan to go over the ewes and cull out those that are undesirable. With the wool off a much better idea may be had of their conformation. However, the culling should actually be begun much earlier than this. Every sheepman should make a set of two-inch or three-inch numbers

ranging from 0 to 9, from heavy wire or one-fourth inch rod. As each ewe lambs a number should be stamped on her side, using wool branding paint, and the same number stamped on the side of her lamb or lambs. In this way a record is kept of her lambing order, relative to that of the rest of the flock, and her progress in raising her lambs can be noted and recorded. Without this the most valuable aid to culling a ewe flock—the record of performance—is not available, and the sheepman is culling “in the dark.” At weaning time he will be able to remember or identify but few ewes and their lambs and just as in buying there is too much tendency to save back the poor milkers and mothers because their extra condition makes them deeper bodied and otherwise apparently of better type.

Old ewes with broken mouths, and thin because they can no longer properly handle their feed, should be shipped to market. Old ewes whose strength has been sapped due to too heavy nursing, if the possibility of putting them back in condition is slight, should also be among those to go. Too frequently for the good of the owner this kind turn into boarders or else give birth to weak, sickly lambs. Ewes that have good teeth and are thin because of heavy milk production should be kept. Ewes that are poor mothers for any reason should be marketed. Those with bad udders, caked udders, and teats so ill-formed that a lamb cannot nurse had better be sold.

Every flock owner has a different problem. Many are trying to build up a high-grade flock, using purebred sires and retaining the best ewe lambs. Such men have an ideal or standard by which they select. Conformity to this standard should not be the only requirement to give the ewe a place in the flock. If she is not a producer, and has not the marks of a producer, she should go with the rest of the culls.

Men who handle western ewes on the farm-flock plan and who may think of saving back ewe lambs might do well to consider that a ewe lamb will bring just as much money on the early spring market as a wether lamb. In most cases this will be enough or more than enough to buy a range ewe of breeding age the following summer or fall. Furthermore by making replacements this way, more uniformity can be maintained in the flock by buying replacement ewes of the same type as the original ewes purchased. In addition to the saving on the original cost western ewes which are ready to breed may be purchased, while the ewe lamb must be kept two summers and a winter before reaching breeding age, and this must be added to the first cost. Some producers argue that they have the pasture anyway and that the cost of growing out ewe lambs is small. If the pasture is available it is well to remember that a ewe in production could use it equally well, and therefore the size of the breeding flock could be increased. Even though some men breed their growthy ewe lambs, it is not a good practice, as their growth is unquestionably retarded and they are not so good mothers as older ewes. It is doubtful if the graded-up ewe lamb will produce any

better selling lamb than a western ewe bred to the right kind of ram, so breeding is of little or no consideration in this case.

Saving ewe lambs is an expensive method of obtaining breeding stock, as is also the practice of buying feeder lambs and growing out the ewe lambs. In either case and especially the first mentioned, the farmer is placing himself in direct competition with the range sheepman who is operating on a much more extensive scale, on cheaper land, lower feed costs and much less labor cost per animal produced. At culling time the rams should not be overlooked. If they are not of the desirable type and their lambs are not thrifty, early-maturing and thick-fleshed, the owner will be ahead financially by getting rid of them.

Sheep are too profitable a class of livestock to be handled in a haphazard way, and the narrow spread between the price of the good ones and the price of the poor ones is too small for a man to attempt to handle any but the best.

## IV. PASTURES FOR SHEEP

### PASTURES ESSENTIAL FOR SHEEP

Pastures are essential to the economic production of sheep. The use of pastures materially decreases the cost of maintaining a flock. Due to the nature of sheep they are able to secure the greater part, and in many instances all of their feed, from pasture crops. Sheep are looked on by some farmers as scavengers and are allowed no pasture except what may be obtained after other classes of livestock have grazed, and what they may pick up from lanes, fence rows and stubble fields. Profitable returns may be had from a flock with the use of but very little grain, if pastures are provided for the sheep. (Fig. 42.)

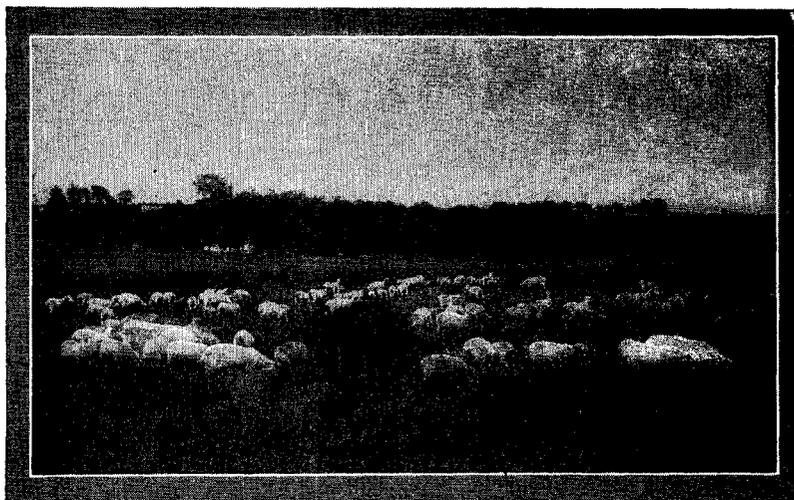


Fig. 42—A part of the station flock on sweet clover pasture.

### USES OF SHEEP PASTURES

Good fresh pastures in August and September will suffice for flushing the ewes in preparation for the breeding season. Good pasture will go a long way in reducing feed costs on pregnant ewes, besides providing an excellent means of giving the ewes the right kind of exercise. In the spring, after lambing time, ewes turned on good pasture will be able to produce more milk for their lambs. Lambs can also obtain a great deal of nutrients from pastures. Dry ewes should receive nothing but pasture. Even the thin ewes will recuperate from their suckling on good pasture.

The flock rams can be kept in a healthier condition when given access to pasture than when kept on dry feeds. Aside from the tonic

effect of pasture crops the green feeds are more or less cooling. Any feed which tends to cool out an animal's system in the hot summer months is of great benefit.

### PASTURE CONSIDERATIONS

In planning pastures for sheep several factors should be given consideration.

**Bloating.**— Sheep bloat easily. The pasture crop should be one which will not readily cause bloat. The tendency to cause bloat can be lessened by care on the part of the flock owner. Sheep will bloat on any pasture that grows if they are turned on when hungry or when a heavy dew is on the grass. If they are filled on dry feed or kept off until the dew has dried, little danger from bloating follows. Even with these precautions bloating sometimes cannot be avoided, especially when rape, sweet clover, alfalfa and such crops are used. If rape or legumes are to be pastured, the danger of bloat is much reduced if some grass like oats, Sudan, or brome is seeded in a mixture with it. This also increases the value of the pasture, both from the quality standpoint and its carrying capacity.

**Hardiness of the Pasture Crop.**— Another factor to be considered is the hardiness of the pasture crop. Sheep graze closer than any other farm animal. This is possible by reason of their thin lips, small teeth, and the fact that they can move either side of their lips independently of the other side. Their sharp little feet will prove severe on annual pastures where the stand is scant. Sheep should not be permitted to graze a crop to the ground if it is the intention to pasture it again. They should be removed and the pasture allowed to grow again.

**Soil Fertility.**— A third factor worthy of the consideration of the flock owner is that of selecting a pasture crop that will add to rather than take from the plant food in the soil. Legumes that are adapted to sheep grazing will take care of this situation very well. Fertility of the soil is also increased by the fact that the droppings of the sheep will be scattered more evenly over the fields than is possible by other stock.

**Small Fields.**— In planning sheep pastures it is better that the field be small rather than large, so that fresh pasture will be available more often. Rotating pastures can be done more easily if the fields are small.

### ANNUAL OR PERMANENT PASTURES

Annual pastures are preferable to permanent pastures for sheep. Fresh pastures can be had more often from annual pasture crops. One of the greatest possibilities annual pastures offer is the means they afford of combating stomach worms. Permanent pastures grazed year after year by sheep become infested with stomach worms. The most satisfactory means of ridding the field of them is by plowing.

**SUGGESTED PASTURE CROPS**

Seeded pasture crops that have proved successful for sheep in Kansas are sweet clover, Sudan grass, rye, wheat, oats, brome grass and lespedeza. Alfalfa is used also, but should be in a grass mixture such as brome and alfalfa, to avoid or lessen bloat danger.

**Sweet Clover.**—Sweet clover, being a legume, puts more into the soil than it takes from it in the way of plant food. Where proper precautions are exercised in pasturing sweet clover trouble from bloating is negligible. It is a hardy plant and proves very efficient as a sheep pasture. For early pasture sweet clover should be sown in late March and early April. For later pasture it can be sown with oats and pastured after the oats is cut. Fall seeding is very successful in producing early pasture the following spring, and oats can be sown in the sweet clover in the late winter. Sweet clover should be drilled or broadcast at the rate of 12 to 15 pounds of scarified seed to the acre. In recent years the new Madrid variety of yellow sweet clover has gained prominence as a pasture crop. A firm seed bed is essential for sweet clover.

The secret in pasturing sweet clover seems to be in not permitting the growth to get too rank and in not allowing it to be grazed too close. Sheep should be turned on when the clover is about 8 inches high. The branches of the sweet clover plant do not come from the crown. Height is necessary that the plant may have branches for foliage. If sheep graze the plant down to the root, and they will do so if starved to it, the plant dies. Sheep should be removed before sweet-clover pasture gets short.

Sweet clover is a biennial. The second year's crop goes to seed about midsummer and is not as readily eaten. Sweet-clover pastures have in many instances reseeded themselves satisfactorily for 5 or 6 years. Should this be allowed to continue for many years the same objection that is had for permanent pastures would hold for sweet-clover pastures.

**Sudan Grass.**—Sudan grass is a crop adapted to all sections of Kansas and will furnish a great deal of pasture. Like sweet clover it should be pastured so that a rank growth will not develop. The only objection to Sudan grass as a pasture for sheep is that where chinch bugs are prevalent they attack the crop. Since Sudan is a rapid-growing crop it may be pastured and rested many times during the growing season. Sudan should be drilled in late May at the rate of 20 to 25 pounds to the acre.

**Rye.**—Rye is another crop which will do well in all parts of Kansas. As a fall and winter pasture crop for sheep it has no superior. Rye for pasture is preferably drilled as near the middle of August as possible at the rate of 1½ to 2 bushels to the acre.

To get the best results as a sheep pasture rye must be grazed close enough that the plants are not allowed to joint. If rank growth is permitted sheep will neglect that part of the field for portions that are grazed more closely.

A special pasture variety of rye, Balbo, developed by the Middle Tennessee Experiment Station has been giving excellent results in Kansas. Some stockmen have reported getting twice as much pasture from it as from ordinary rye.

**Rape.**—Rape makes an excellent sheep pasture on productive land in northeastern Kansas. In other sections of the state it is usually too hot or too dry for best results with this crop. Under Kansas conditions rape must be sown in the early spring. It is usually drilled or sown broadcast at the rate of 4 to 6 pounds to the acre, but for sheep pasture at this station better results have been secured when something else is sown with rape. Where regular yields of rape cannot be relied upon the necessary expense for seed and preparation of the ground makes it an expensive crop.

Rape may be pastured, rested, and pastured again, when growing conditions are favorable. Rape has been pastured as late as November at this station.

**Alfalfa.**—Although alfalfa fills other requirements it is dangerous as a sheep pasture due to the great tendency to cause bloat when pure stands of it are pastured. It is excellent, however, to use in mixtures with other crops such as brome.

**Oats.**—Oats makes an excellent pasture for sheep. The yield of forage is not high and the cost of seed and seedbed preparation make it expensive to use except where it is sown with other crops such as sweet clover and rape.

**Brome Grass.**—Brome grass is fine sheep pasture wherever it thrives in Kansas, which is mostly in the northern part of the state. It is relished very much by sheep and is nutritious. It furnishes more and better pasture when grown with alfalfa and removes the bloat danger from alfalfa pasture. In northeastern Kansas fall seedings of 12 to 14 pounds brome grass and four pounds of alfalfa have given excellent results for sheep pasture.

**Lespedeza.**—In southeastern and eastern Kansas lespedeza has been the main pasture crop for sheep in recent years. It is a fine, leafy legume, palatable, and furnishes heavy grazing on poor, infertile, sour soils. It is a good hay crop, too, wherever it thrives.

**Bluegrass, Bluestem and Buffalo Grass.**—The bluegrass, bluestem, buffalo and other native grasses all furnish good sheep pasture. The objection to them is, as stated before, that permanent pastures are quite likely to harbor stomach worms.

## V. PARASITES OF SHEEP

There are two classes of sheep parasites, internal and external. In Kansas stomach worms, nodular worms and tape worms are by far the most serious internal parasites, while ticks and mites are the worst external parasites found in the state.

**Stomach Worms.**—Stomach worms have caused serious losses among Kansas flocks. The best means of combating them is prevention. The best means of preventing them is by rotating pastures. When sheep are given a new pasture every three weeks there is little likelihood of infestation from worms. However, this is not practica-



FIG. 43.—Drenching sheep. (I) Drenching with bottle. (II) Drenching with rubber hose and funnel.

ble on many farms, since considerable outlay for fencing would be required. Other methods of control, discussed later, are advisable on all except strictly specialized sheep farms producing rather extensively.

Sheep which are infested with stomach worms show pale whitish skins. The white of the eye will be bluish or colorless. The animal may have a depraved appetite and scouring and coughing may be present. The adult worm is less than an inch long, hardly as large as a pin, and pink in color. Stomach worms are found in the fourth stomach of the sheep. In this stomach the adult worm lays thousands of eggs daily. The eggs pass from the sheep in the droppings, and hatch in a very short time under favorable conditions. The larva then crawls onto blades of grass where it encysts and is taken in by the lambs or sheep in grazing. It reaches maturity in the

fourth stomach, completing the life cycle. The larvae after hatching are less active during dry weather. Damp weather is favorable to them. They are quite hardy in the cyst stage and can withstand long periods of drought or freezing, becoming active when conditions are favorable. The stomach worm is a sucking parasite. The adult will be found attached to the wall of the fourth stomach. The constant sucking of blood at this vital point by thousands of stomach worms keeps the sheep in a weakened condition and in some instances causes death.

Drenching with appropriate remedies is the best means of ridding the sheep of this parasite. Care should be exercised in drenching. The sheep should be securely held, and the dose should not be administered while the sheep is struggling. The sheep should be made to stand on all four legs, and the nostrils should not be raised higher than the level of the eyes. The dose may be given from a drenching bottle, or by means of a rubber hose and funnel (Fig. 43).

A 1 percent solution of copper sulphate will prove effective in killing worms. This may be obtained from any druggist or made at home. If made at home, 1 ounce of blue copper sulphate crystals is dissolved in 5 pints of water. White crystals should not be used. The dose of this solution is 2 ounces for a lamb and 3½ ounces for an adult sheep. Animals that are to be dosed should be withheld from feed and water 12 to 20 hours before and 6 hours after drenching.

Nicotine sulphate is also a good remedy for stomach worms. One-half ounce of a 40 percent solution may be diluted with 1 quart of water. The sheep should be deprived of feed and water before and after drenching the same as for the copper sulphate treatment. The dose of this diluted solution is 2 ounces. Lambs may stagger from this treatment unless a great deal of care is used in drenching.

Two or more drenchings with either of these solutions at intervals of 10 days may be required to rid the flock of worms.

This station has found the combination of the above two treatments economical and highly satisfactory. It consists of mixing equal parts of a 1 percent solution of copper sulphate and a 1 percent solution of "Black Leaf 40" (0.4 percent solution of nicotine sulphate). The dosage for mature sheep is 3½ to 4 ounces. It is effective against tape worms as well as stomach worms.

Tetrachlorethylene globules are satisfactory for stomach worm control. They can be bought commercially prepared for the specific purpose. They are more expensive than the foregoing home-mixed drenches but perhaps are more convenient to administer.

Phenothiazine recently has become very popular as a vermifuge for almost all classes of farm animals. It has been used extensively for sheep. Fortunately it is effective in controlling stomach worms of the several different species found in different areas and it is also effective against nodular worms. It will not control tape worms, however.

Perhaps the greatest objection that has been raised against

phenothiazine is its cost. It has been quite expensive, but the cost is being reduced as its use expands and it undoubtedly will become more economical. Phenothiazine also causes the urine to stain red and this is objectionable if it gets on the wool. It is best to bed sheep with straw if they are confined following drenching, to prevent the wool from being stained.

The question is often asked, what is the best method of administering phenothiazine. So far as is known, the "best method" has not been established. It is given by a number of methods as follows: In a water suspension; the powder mixed with molasses and water; the powder mixed with feed and in the form of commercial pellets. A number of reliable pharmaceutical houses now produce phenothiazine in some form, together with instructions for its proper use. It is not possible to say at this time (1943) which method is best. Much experimental work is still in progress. Wherever nodular worms are present or when sheep do not respond to the use of other vermifuges, phenothiazine should be used, at least once during the summer, instead of one drenching with other material.

Recent experimental work with phenothiazine has been reported by workers in the Zoological Division of the Bureau of Animal Industry. They state that good results have been obtained in two years' tests in controlling stomach worms and nodular worms by placing before the sheep a mixture of 1 part by weight of powdered phenothiazine and 9 parts loose granular salt. Workers at other stations have reported results which indicate that a mixture of 1 part phenothiazine to 14 parts salt will control stomach worms satisfactorily.

This method of controlling stomach worms promises to revolutionize sheep production in some areas. The elimination of much work entailed by individual handling will result in better parasite control on the part of more sheepmen.

While those who have experimented with this method of control point out that the work is not yet conclusive, their results and those observed in actual farm conditions give reason for endorsing and encouraging the adoption of this means of combating internal parasites.

**Ticks.**—Most flocks of sheep in Kansas carry more or less tick infestation at some time. They cause considerable economic loss to sheepmen of the state. Sheep with heavy tick infestations are not efficient producers of either lambs or wool. They become unthrifty, grow less wool and rub much of it off. Furthermore, ticks move from older sheep onto the lambs in the spring and as a result the lambs also become unthrifty and make inefficient use of their feeds and do not grow as they should.

Dipping is the only way sheepmen can expect to control ticks. There are dips which destroy the tick eggs as well as the live insects, and which if used make only one dipping necessary. At this station it has been found that one dipping a year soon after shearing controls ticks in an altogether satisfactory manner. However, every

sheep including the lambs should be dipped and should be completely immersed.

Certain precautions should be observed in dipping sheep. They should not be too full; it is a good plan to hold roughage away from them and keep them off pasture for a few hours before dipping. Water should be kept before them so they will not be thirsty as this is an invitation for them to drink some of the dip, which may be fatal. A good dipping program would probably increase the wool clip per sheep from 10 to 20 percent and improve the quality of the wool at the same time.

**Sheep Scab.**—There have been some serious outbreaks of sheep scab in Kansas in the past two years. When this parasite gets started it is difficult to eradicate, especially in a farm flock area. Too often somebody will buy a few sheep at a community sale or elsewhere, find they have bought some scab and without reporting it will sell them again, perhaps to several buyers, thus scattering it.

Regulations require that when scab is found, it be reported to the Livestock Sanitary Board so that a quarantine can be established immediately and a supervised eradication campaign started. Following this procedure is also the cheapest and quickest way to eradicate scab. Sheepmen should also be sure sheep are free from the scab mite before they bring them on their places.

## VI. SHELTER AND EQUIPMENT FOR SHEEP

### SHELTER REQUIREMENTS

Shelter requirements for sheep are simple. The shelter should provide a dry place for the sheep to lie with freedom from drafts but with adequate ventilation. Expensive barns are not needed.

Few barns in Kansas have been built especially for sheep. The usual procedure, when shelter for sheep is needed, is to change and alter barns that have been built for other classes of livestock. Such barns serve their purpose well and can be fixed for sheep with little or no expense.

### THE SITE

When a barn or shed is to be built for sheep the first consideration should be to locate it on high, well-drained ground. Shelter which is damp is unhealthful and unfit for sheep. The building should also be located so that it will be handy to pastures.

### CONSTRUCTION

**Barns or Sheds.**—Frame work is the cheapest and most logical construction for sheep barns. The type of building may satisfy the builder's preference. (Fig. 44.) The simpler the construction the more efficient it is. One of the most satisfactory types of sheep barns in Kansas is a shed, 32 feet wide and 420 feet long. (Fig. 45.) The shed extends east and west and is open to the south. It has a gable roof, the ridge pole being 15 feet from the ground. The walls are 5 feet high, with burlap curtains on the open side. From 1,200 to 2,000 ewes are lambled in this shed each spring.

Sheds of this type are satisfactory for any kind of sheep, provided they are deep enough. Depth to the shed is desirable because narrow sheds afford little protection from driving rains and drifting snows. Gable roofs give more protection than shed roofs.

Open sheds are preferable for fattening lambs. Warmth is not necessary or desirable in a sheep barn except that at lambing time ewes and little lambs should be housed so that there will be no danger of chilling. One thickness of boards will suffice for walls. In Kansas, where practical, a loft is desirable because it helps break the extreme heat in summer. Heat is more of a problem in Kansas than cold. If the barn is so constructed that the sheep can keep cool in it during summer it will prove adequate protection in winter.

**Wide Doors and Low Sills.**—One of the advantages of the deep open shed for sheep is that there are no doorways in which they may be crowded. When a barn is used for sheep the doorways should be wide, otherwise the sheep are likely to develop injuries in crowding through them. High sills are objectionable because the sheep have to jump over them. Narrow doorways and high sills are especially dangerous to pregnant ewes.

**Windows and Light.**—The open shed gives ample light and ideal ventilation for sheep. Barns for sheep should have plenty of windows for the same purpose. A dark, poorly ventilated barn will become damp.

**Floors.**—Dirt, preferably tightly packed clay, makes the best floor for sheep barns.

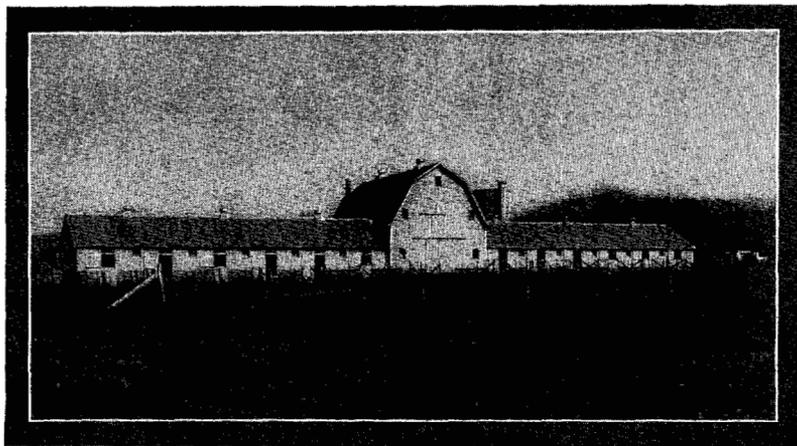


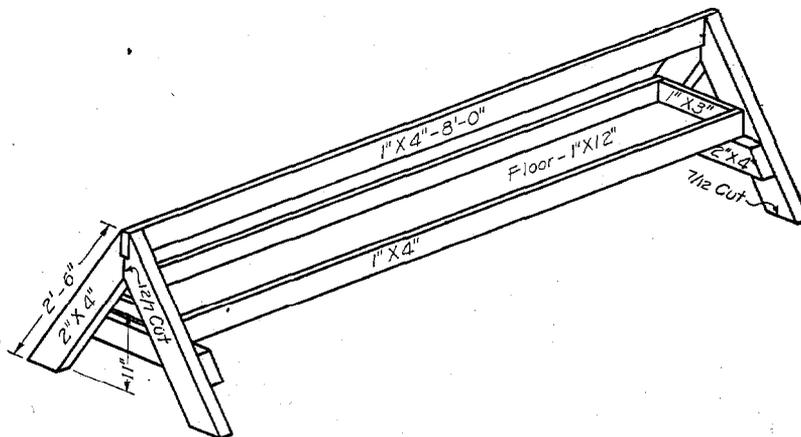
FIG. 44.—The sheep barn of the Kansas Agricultural Experiment Station, at Manhattan, Kan.



FIG. 45.—A simple and adequate lambing shed.

EQUIPMENT

Equipment should be planned to facilitate the handling of the sheep. Much time, labor and expense may be saved with proper equipment, which, like the shelter, should be quite simple yet, efficient.



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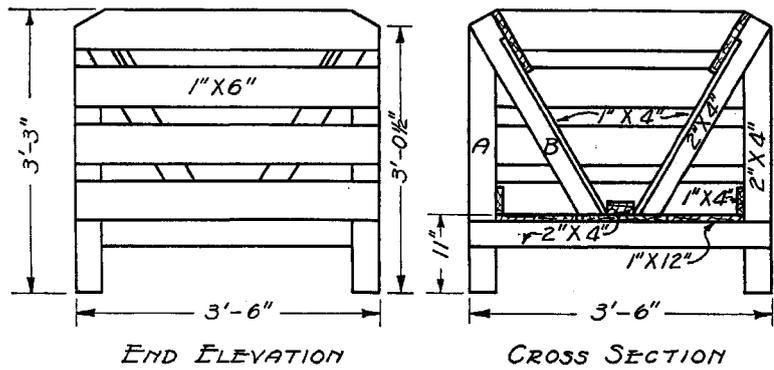
FIG. 46.—A grain bunk.<sup>2</sup>

2. Plan No. 77-528. Sheep-feeding bunk, 8' 0" long. A frame, rectangular trough 12" wide. One sheet, bill of material, 10 cents. Address, Engineering Experiment Station, K. S. C., Manhattan, Kan.

**Feed Bunks.**—Bunks should be provided for the feeding of grain, else considerable of it will be wasted. A long trough 4 to 6 inches deep serves this purpose well. (Fig. 46.)

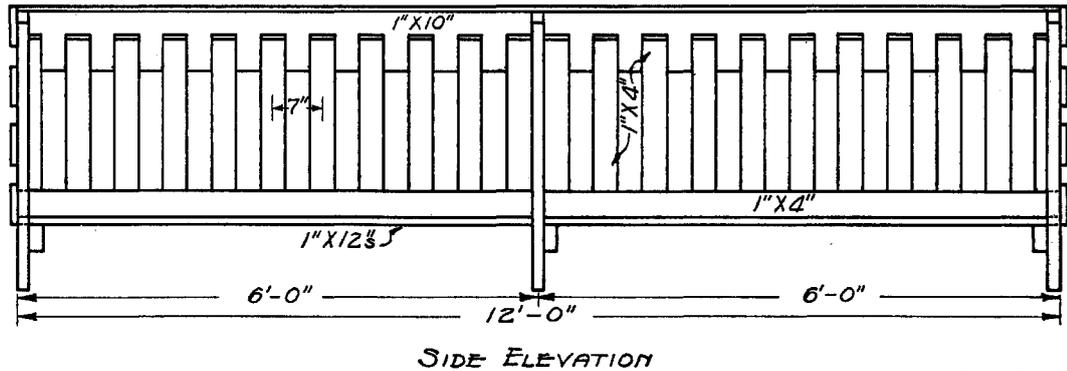
**Combination Racks.**—A combination rack can be made for the feeding of both roughage and grain. (Fig. 47.) The box part of such a rack should be not less than 4 inches deep. If space between slats is wider than 3½ inches, small sheep and lambs are likely to get their heads fast between the slats. Figure 48 shows a type of combination rack which is very effective in keeping chaff, leaves and seed out of the wool. Figure 49 shows another rack which may be used for feeding either grain or roughage. Sheep do not waste feed from this type as they do from some of the others. Such a rack requires more space for each lamb than the other types. One foot of bunk space should be provided for lambs and yearlings. Pregnant ewes should be allowed at least 2 feet of space.

**Posts and Boards.**—Fence posts and boards provide a very good means of feeding dry roughage. The posts can be set around a hay-stack or around the outer edge of the feed lot. An 8-inch board is nailed horizontally along the posts 3 inches from the ground. Another board is nailed above the first one leaving a gap of 8 to 10 inches, through which the sheep may put their heads. The feed is



**BILL OF MATERIAL**

No.	Req.	Size	Length	Grade	Remarks
9		1" x 4"	14'-0"	1/2" Y.P.	Hopper Slats
2		1" x 4"	12'-0"	1/2" Y.P.	Box Sides
3		1" x 12"	12'-0"	1/2" Y.P.	Floor
2		1" x 10"	12'-0"	1/2" Y.P.	Hopper
2		1" x 6"	14'-0"	1/2" Y.P.	Ends
5		2" x 4"	12'-0"	1/2" Y.P.	Framing
2		6d			Com. Nails
1#		8d			Com. Nails
2#		16d			Com. Nails



**SIDE ELEVATION**

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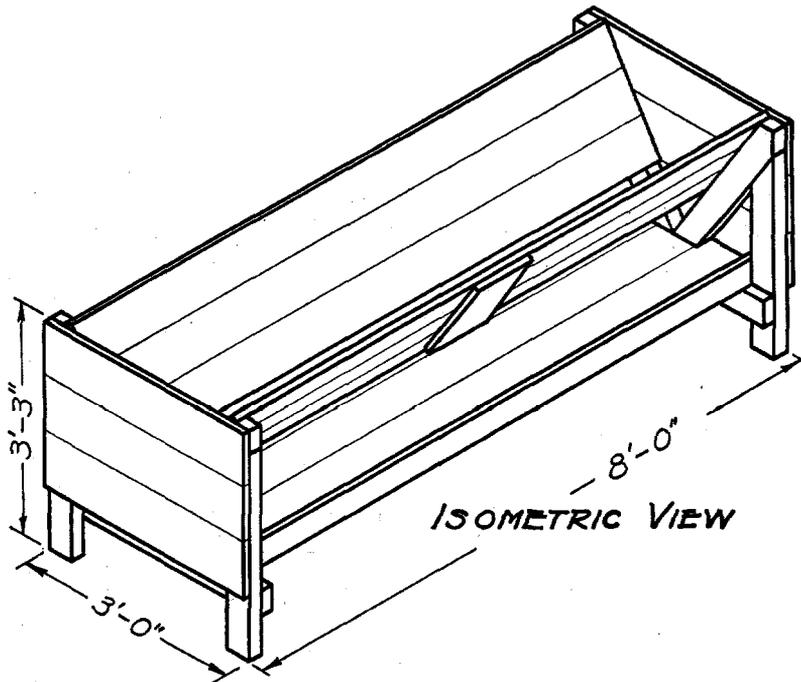
FIG. 47.—A combination feeding rack.<sup>3</sup>

3. Plan No. 77-522. Sheep-feeding rack. 3' 6" wide, 12' 0" long. Hopper-style rack. One sheet, bill of material, 10 cents. Address, Engineering Experiment Station, K. S. C., Manhattan, Kan.

pushed up against the boards so that the sheep may eat. There is little or no waste by this method of feeding roughage.

**Water Trough.**—An excellent water trough for sheep may be made by sawing a barrel in two halves.

**Hurdles.**—Hurdles may be used in many ways about the sheep barn. In dividing pens, holding sheep in corners, closing lanes and alleys, and making temporary pens, they are a great convenience. Small hurdles are used for making individual pens for ewes at lamb-



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FIG. 48.—A rack which protects the wool from seed, chaff and leaves.<sup>4</sup>

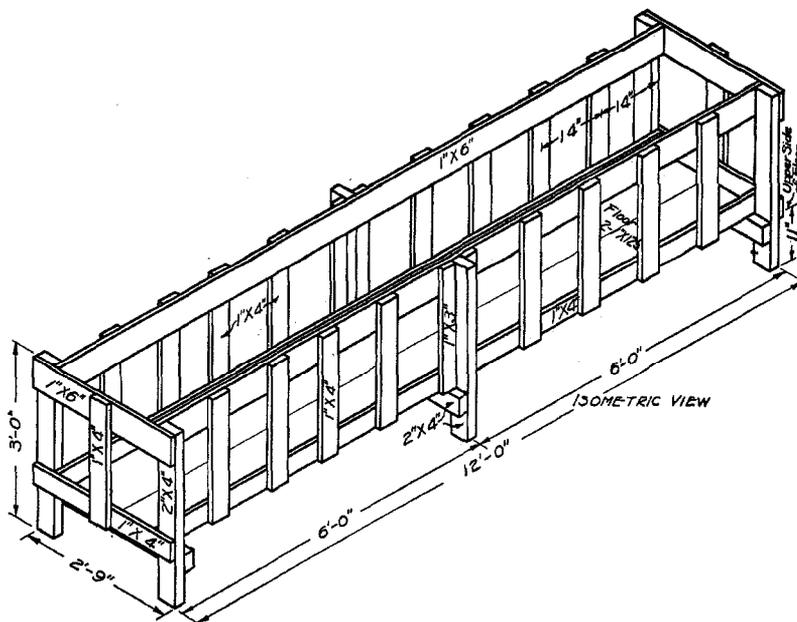
4. Plan No. 77-524. Sheep-feeding rack, 3' 0" wide, 8' 0" long. Rack-hopper type. One sheet, bill of material, 10 cents. Address, Engineering Experiment Station, K. S. C., Manhattan, Kan.

ing time. Hurdles should be light so that they may be handled with ease and strong enough to hold the sheep. Good hurdles may be made from 1-by 4-inch boards.

**Cutting Chute.**—If large numbers of sheep are handled it is advisable to construct a chute (Fig. 50) so the work may be done easier and in as short a time as possible. The chute should be built so that it will conveniently open from a place where the sheep can be penned. It should be only wide enough for one sheep to pass through at a time. The sheep will go through more readily if the chute is boarded solid so they cannot see out through the sides. It

need be only high enough that the sheep cannot see over. At the end of the chute where the cutting and sorting is to be done a gate should be hinged so that it will permit the sheep to go into one or the other of two lots. A handle should be put on the gate so one man may handle the sheep with one hand and open or close the gate with the other. When one sheep starts through the chute the rest will follow. Such a chute will be a great aid in sorting lambs for market.

**Dipping Vat.**—When the flock is a permanent project on the farm a dipping vat will make it possible to prevent lice, ticks and



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FIG. 49.—A type of combination feeding rack.<sup>5</sup>

5. Plan No. 77-526. Sheep-feeding rack, 2' 9" wide, 12' 0" long. Combination rack and bunk. One sheet, bill of material, 10 cents. Address, Engineering Experiment Station, K. S. C., Manhattan, Kan.

skin troubles. A galvanized-iron tank of a size to suit the flock may be purchased. The vat should be set in the ground. A wooden runway can be built to the deep end of the vat. At the other end a small pen should be built to hold the sheep until the dipping solution drips from them. This pen should be so constructed that the drip will drain back into the vat. The sheep carry a great deal of the solution from the vat in their wool. If it is not allowed to drain back in, it is necessary to replenish the solution frequently. Standard dips are obtainable at all drug stores with full directions for using them. Nicotine sulphate dip is used at this station.

**Fences.**—The fencing problem has kept many farmers out of the sheep business in Kansas. If sheep are to be limited to any given area it will be necessary to provide fence. The cheapest fence that will prove satisfactory for sheep may be made from 26-inch woven wire, with three strands of barbed wire placed above. A 32-inch woven wire would be still better. The 32-inch wire with one strand of barbed wire below and three strands above will make an excellent fence. The smaller the mesh in the woven wire the better it is for sheep. A large open mesh may permit them to get fast in the fence. When sheep are the only animals that come in contact with the fence the posts may be spaced farther apart than is customary when fencing for other classes of livestock.

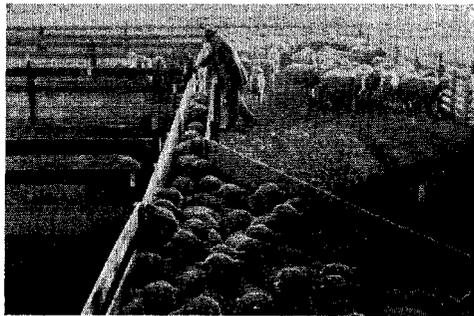


FIG. 50.—Cutting chute being used to separate sheep or lambs.

Electric fences have been used with only moderate success. For sheep the wire should be 14 inches above the ground. It is difficult to prevent weeds and pasture plants from growing up and short-circuiting the current. Sheep usually smell of a fence when they are first confronted with it. IF they get a shock then, they will usually avoid it thereafter.

For information on the lamb feeding industry, see Kansas Agricultural Experiment Station Bulletin 287.

