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LIVE STOCK MANAGEMENT

Sheep Raising in Oregon

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SHEEP RAISING IN OREGON.

GENERAL CONDITIONS

The raising of sheep in Oregon may be divided into about five distinct phases, each requiring different conditions for success. These may be enumerated as follows:

1. Raising sheep on the range.
2. The fattening of range sheep on grain and hay in winter.
3. The raising of spring lambs on the cultivated farms, such as are found west of the Cascade Mountains.
4. The raising of pure-bred sheep.
5. The raising of hot-house or winter lambs.

In any discussion of sheep raising in Oregon it is absolutely necessary to keep these different phases of the industry distinctly in mind, for facts which apply to one branch of the industry may have no application whatever to another.

1. The essential features of the raising of sheep on the ranges are as follows: extensive use is made of rough range land not suitable for cultivation, such range usually being public land either within or without the Forest Reserve; the sheep are handled on a large scale, the unit of management being a "band" ranging from 1500 to 3,000 head; the sheep are seldom kept under fence but are nearly always herded; and lastly, the raising of sheep on the ranges is a business in itself and is not ordinarily conducted in connection with, or as a by-product of, any other line of agriculture.
2. The fattening of range sheep on grain and hay, is a business confined strictly to those districts in Eastern Oregon where alfalfa is abundant. It is conducted exclusively in the winter time, and it is a business that is usually carried on in connection with either raising sheep on the range or the raising of hay and grain on the farms. This industry is not found west of the Cascade Mountains.

3. The raising of spring lambs on the cultivated farms west of the Cascade Mountains is a business that is conducted on a small scale in connection with some other form of general grain and hay farming. The flock usually consists of 20 to 100 ewes. These sheep are never herded, but are always fenced, for the most part on cultivated land. Some native pasture is used, but not a large amount.

4. The raising of pure-bred sheep may be carried on either on the range or the cultivated farm. In the first case the sheep are handled in practically the same manner as other kinds of range sheep, except that they are given rather better care and feed. When raised in Western Oregon, they are handled approximately the same as spring lambs, except that they must be kept through the dry part of the sum-
mer and can not be sold as can the commercial lambs, when the good spring grass becomes scarce.

5. The raising of hot-house or winter lambs includes the raising of lambs for the very early market, such as February and March. These lambs are raised in small lots on the general farms of the Willamette Valley.

The first four systems of sheep raising are practiced quite extensively in their respective parts of the State. The raising of hot-house lambs, however, is, and probably always will be, a very small industry. It is of interest more for its possibilities than for anything that has already been accomplished.

There are in the eastern part of the State approximately 2,339,000 sheep. (1910 census). Practically all of these are raised on the range, and of these it is estimated that somewhere between one-half per cent and one per cent are pure bred. Winter fattening is practiced by only a limited number of men. Probably between 20,000 and 50,000 lambs and sheep are fattened each winter in this State. West of the Cascade Mountains there are approximately 360,000 sheep, (1910 census), the larger portion of which are handled as spring lambs. A few, perhaps not to exceed 50,000, are handled under conditions somewhat similar to those found on the ranges in the eastern part of the State. The proportion of pure-bred sheep in Western Oregon is very small as compared with the total number, but is doubtless several times that found east of the mountains.

RAISING SHEEP ON THE RANGE.

The management of sheep under range conditions is totally different from that followed in the farming districts. The natural conditions and environment in the western states require a distinct system of management, and the extensive scale upon which the sheep industry is conducted, together with the high price of labor and the comparative inaccessibility of some of the larger sheep ranges, have rendered it necessary to form a system of management which is comparatively uniform throughout the range districts, not only in Oregon, but throughout the West, from Canada to Mexico, and from central Kansas to the Cascade Mountains. While the general system of management throughout the western states is quite uniform, certain differences prevail in different states, particularly on account of climatic, labor, and transportation conditions. In this State, however, the range conditions are sufficiently uniform so that the small differences in management that are found, are due to differences in judgement on the part of the owners or operators rather than to actual necessities.

Lambing. The proper lambing season is the earliest time of the year at which suitable climatic and feeding conditions may be expected. It is not desirable to have the lambs come before the grass starts in the spring for the reason that without green grass the ewes might not give sufficient milk for the development of the lambs. The possibility of late storms is also an important consideration, especially in the higher altitudes. The actual date of lambing varies somewhat according to local conditions and according to the amount of hay and feed room
which the owner may have. The larger portion of the range lambs in this State come during the month of April.

At lambing time a large number of extra men must be hired. During the other seasons of the year from 1500 to 3000 sheep are handled in one band, but during the lambing season each one of the larger bands must be divided into a number of smaller ones. As far as possible, the older and more experienced herders are put in charge of the lambing pens, and the owners and managers in this season of the year are obliged to give the flocks the closest personal attention. The actual details of the lambing methods in different parts of the State vary somewhat. At the present time there are two principal methods of lambing; namely, the lambing shed, and the open range.

**The Lambing Shed.** Of the two methods, the one using the lambing shed is the newer. It was brought about by the homesteading of the winter range, and the success attained with it brought it into great favor with the sheep men. The lambing shed, which is not an expensive structure, is so arranged that the ewe and lamb after lambing are kept inside and fed until the ewe comes well into milk and maternal relationships have become well established. Where the lambing shed is used, the sheep do not roan over the open range but are usually enclosed in a yard adjacent to the shed. The band of ewes is watched very closely night and day, and as soon as a ewe lambs she and her lamb are removed to a place in the lambing shed. If the lamb is dropped during the night the ewe and the lamb are placed by themselves in one of the small pens in part of the shed marked B. (Figure 1). Here they are left until daybreak, at which time they are removed and, if the ewe had only one lamb and owned it, are placed in pen 1. Each ewe which lambs during the day is placed in pen A until she has cleaned, and has given indications whether she owns the lamb or not. As soon as this is accomplished, she also is placed in pen 1, so by night pen 1 contains ewes with their lambs that were dropped during the preceding 24 hours. The next morning this bunch of ewes is moved to pen 2, so as to leave pen 1 vacant for a fresh lot of ewes. Every morning this bunch of ewes is moved until on the fifth day they are in pen 5. On the morning of the sixth day they are ready to leave the shed and go to the adjacent range. All ewes that are stubborn and all ewes having twins, instead of being placed in pen 1 are placed in one of the lambing pens marked C, where they are left until there is no doubt as to relationship between the ewe and the lamb. As soon as the proper maternal relationships have been established the ewe with her lamb or lambs is placed in pen lettered D. Each succeeding day she is moved to the next pen, going from pen D to E, from pen E to F, and from F to G, and from G to H, and from pen H to 4, from pen 4 to 5, and from pen 5 to the outside. By this arrangement all stubborn ewes and ewes having twins are kept inside 7 days after they own their lambs, and all ewes having singles and owning them are kept inside the shed for five days. The accompanying diagram, Figure 3, is of a shed, which the author saw in operation in a flock where the lambs were being dropped at the rate of 80 every 24 hours. Five men handled the lambing of this band. One was a night-drop picker, one
a day-drop picker, and three were shed men. The duty of the night-drop picker is to watch the band at night and as soon as a lamb is born, he puts the lamb and its mother in one of the night lambing pens marked B. The duties of the day-drop picker are quite similar to those of the night-drop picker, but instead of placing the ewe and lamb in one of the lambing pens marked B, he places them in pen A. The duties of the shed men are to care for all ewes that enter the shed and shift them to their proper pens.

The system of lambing in the shed has several distinct advantages,

which can be enumerated as follows: first, it saves a great deal of labor; second, it increases the percentage of lambs; third, less orphans and dead lambs result; fourth, it gives better and stronger lambs, as the ewes cared for in this manner give more milk.

**Lambing on the Open Range.** Lambing on the open range differs from that in the shed primarily in that the sheep are not kept up in a shed but are herded on the range during the day and corraled at night. In different localities lambing on the open range varies somewhat, but the following may be taken as a fair example. As soon as the lambs begin to appear, a night herder is placed in charge of the flock. As soon as the lamb is born it is removed from the corral and is placed with its mother in a small lambing pen, of barely sufficient size to hold the ewe and lamb. They are kept in these pens for a number of hours or until it appears the lamb is "owned" by the ewe.

Some sheep men vary the above procedure by bedding the drop bands just outside the corrals. The lambs which are born during the night are, under this system, not disturbed unless something is radically wrong. The next morning the ewes which have no lambs move away from the bedding ground and leave the ewes and their young lambs behind. Where the ewes have been bedded outside, this separation is comparatively natural but is effected without disturbing the young lambs to any great extent. After the newly born lambs and their mothers have been separated out, those lambs which do not seem to be properly owned are put in the small pens with their mothers, while others are worked out onto the range to graze. This system requires much less work than where the ewes are corraled at night but is probably not quite so effective.
During the daytime an extra herder follows the lambing band and the young lambs and their mothers are separated from the main band, generally known as the "drop" band, and are gathered together in small bands of 10 to 30 head. As soon as a small bunch of ewes with their newly born lambs are gathered together, they are left behind and a tall stake with a flag erected in order to show their location. The ewes and their lambs will not stray far from this place for the first 24 hours. During the course of the day several of these bands are separated out. They are not usually moved the first night but left out on the range right where they are. Especial precautions are sometimes necessary to keep off wild animals. A lantern may be hung on a stake to keep away the coyotes, or the herder may fire off guns or fire crackers from time to time. The next morning these small bunches of newly born lambs are brought together and put with other ewes and lambs to form what is known as the infant herd. Where the range is level, a lambing wagon is often used. This wagon has a broad, flat-bottomed rack, which is divided into about 21 small pens, each barely large enough to hold the ewe and lamb. Each pen is so arranged that it opens toward the back. This wagon goes out on the range every morning. As each ewe lambs, she and her lamb are placed in one of these pens. At noon or at night, or as soon as the wagon is full, it returns to the corral, where the ewes and lambs are placed in the care of an experienced shepherd. Here the ewes are banded together in an infant herd, much the same as where the wagon is not used. At first, there are usually about 100 in each infant band, but as the lambs grow older the smaller bands are put together, thus gradually increasing the herd until at the end of about 10 or 15 days there will be 1200 or 1500 ewes with their lambs in each band. The lamb bands are from this time on driven...
greater distances from the home ranch, but are not usually moved to
the summer range until they are a month or six weeks old.

The reason for keeping the ewes in such small bands at first is
to make sure that the lambs are owned by their mothers. It is a well
known fact that if the ewe becomes accidentally separated from her
lamb for 24 hours or more she is very apt to forget the scent of her
lamb and for this reason refuse to own it in the future. All
lambs which are disowned or whose mothers have died are known as
"bums." They are usually given over to some ewe that has lost her
lamb; this failing, they must be taken to the ranch house and brought
up on bottles, or else allowed to die. The loss of the lambs is not the
only unfortunate feature of allowing the mother and lamb to become
separated, for the ewe's udder may become spoiled so that she will be
permanently incapable of secreting milk. Wherever there is any diffi-
culty in making the ewe own the lamb, the ewe is put in an individual
lambing pen along with the lamb and left there for such time as may
be necessary. When this treatment fails, other or additional measures
may be adopted, for instance, the ewe may be fastened in a stanchion
made by driving two stakes in the ground about four inches apart at
the bottom and fastened together at the top with a small rope or wire.
Rubbing some of the ewe's milk on the lamb will also assist, since the
ewe recognizes her lamb entirely by scent, and not by sight, sound, or
touch. Where a ewe is expected to own a lamb not her own, as where
her own lamb has died, it is a very common practice to take the skin
of the dead lamb and fasten it over the back of the other lamb. In
no case should the skin be left on the adopted lamb longer than 24
to 48 hours. If the ewe and lamb are kept in a small pen, no further
difficulty will be experienced.

The tendency of ewes to disown the lambs is partly dependent upon
the natural disposition of the ewes and partly upon the feed and treat-
ment which they have received. Ewes that are thin and badly run-
down at lambing time will not own their lambs as readily as those that
are in better condition. Hard, late winters are usually followed by in-
creased difficulties at lambing time. These same conditions, of course,
also affect the milk flow, and it has been found that the willingness
of the ewe to own the lamb is almost directly proportional to the
abundance of her milk.

Percentage Increase. The percentage of lambs which are raised
varies greatly in different years and with different sheep men. Under
extreme conditions it may vary from 50 to 100 lambs to each hundred
ewes, or from 50 to 100 "per cent increase" as it is termed. As a rule
extreme losses are due to unfortunate conditions as to feed and weather,
whereas one hundred per cent increase is found only under the most
favorable conditions. The average increase in Eastern Oregon is be-
tween 80 and 85%. This percentage allows for losses in barrenness,
abortion, and the death of lambs, and also for the partial com-
pensation of those losses by the birth of twins. Under range con-
ditions the production of any great number of twins is considered a
distinct disadvantage. The reason for this is that where ewes are kept
in large bands they may manifest no desire to find both lambs at
sufficiently frequent intervals. The presence of one lamb appears to be satisfactory to the ewe and the result is that one or the other of the lambs becomes neglected and develops into a “bum.” An even more serious reason is that under the hard conditions of range life very few ewes are capable of supporting more than one lamb.

Shearing. The time of the year for shearing, like that for lambing, varies with the climatic and other conditions. On the ranges, nearly all of the shearing is done some time during the months of May and June.

The work is done by professional shearers who travel from one part of the country to another as the season advances. Some of these men work during our winter season in the southern hemisphere, especially in Australia and Argentine. On account of the unusual amount of experience which these men have had, they are able to shear close to one hundred sheep a day. Whole crews often average 90 a day for several days, while records for a single day’s work of 250 or more are not uncommon. One record of 316 lambs in 8 hours is reported from Australia. Within the past ten or fifteen years, machine shearing is largely taking the place of hand work. The machine shears are usually arranged in gangs of from ten to forty machines all run by one engine. The chief advantages of machine shearing are: a neater job; less cutting of the skin; and slightly more wool. An expert can shear about as many by hand as by machine, but an amateur can work much faster with a machine. Many sheep raisers who have had extensive experience claim that they get one-half to one pound more wool by machine shearing than by hand work. It was at first feared that the very close shearing done by the machine might subject the sheep to damage when exposed to the burning sun or storms, but so far, few bad results from these sources have been noticed. In this State a great deal of shearing is still done by hand, but the use of the machine is growing. The process of shearing large flocks occupies considerable time under the most favorable conditions, and since the sheep spend most of this time with very little feed it is necessary to work with the greatest possible speed. On this account the sheep men are quite partial to the large plants that can shear an entire band in one day.

Division of Range According to Season. As a rule sheep ranges are so located that the range which each man controls may be readily divided into a summer and winter range. The summer range must be located in the higher altitude, generally on the mountains, where the high plateaus, burns, and mountain meadows of various sizes furnish green grass during the months when the lower ranges would be too dry. The necessity for green grass in mid-summer in all cases is very great. The ewes require green grass during the months of June, July, and August in order that the milk supply may be maintained at a maximum. As soon as the lambs begin to eat grass, which usually occurs at one to two months of age, they require green feed even more imperatively than do the ewes. A very large portion of the summer range of Eastern Oregon is located in the forest reserve and this explains the great anxiety of the sheep men in securing grazing permits within these reserves.
In this State sheep are taken to the summer ranges at some time during the latter part of May or the first part of June; the actual time varying with the season and with the locality. Most of the shearing is done before the sheep go on the summer range. It is not our purpose to discuss the controversies which have arisen concerning the use of public grazing lands by sheep men, especially in the forest reserves. It will perhaps suffice to state briefly a few of the complications which arise from the present system of managing sheep during the summer. Sheep men maintain that the privilege of entering mountain pastures, whether in forest reserves or elsewhere, is absolutely necessary for the successful conduct of the sheep business. Cattle men, on the other hand, claim the same privilege and assert the same necessity. It is furthermore maintained by the cattle men that the presence of sheep on a given range renders impossible the grazing of cattle upon that range. It is therefore asserted that the sheep men thus have a distinct advantage over the cattle men in that the former can drive the cattle off the range by the mere presence of sheep. Without passing judgment upon the conditions surrounding any forest reserve or other mountain grazing areas, it may be justly asserted that the sheep and cattle business can be conducted in the same locality on a peaceful basis and with profit to all parties concerned provided there is a mutual recognition of the rights of all parties. The mere presence of sheep upon a mountain meadow does not involve the destruction of the grass or timber, provided the sheep are maintained in a rational manner. That sheep grazing, however, may result not only in great injury to young trees but in the total destruction of the range, has been abundantly demonstrated in many forest reserves.

In regard to the management of sheep, whether on summer or winter range, it may be affirmed as a general proposition that the less the sheep are interfered with the less injury they will do the range. When sheep are maintained in bands of from 2,000 to 3,000 it is necessary for several reasons that they should be allowed to feed in a comparatively open formation. One frequently notices the continual worrying and harassing of the sheep by young and inexperienced herders, who seem to feel that some of the sheep may be lost if the band is not kept huddled together. The great disadvantages of keeping a large band of sheep close together should be sufficiently apparent upon a moment's thought. In the first place the injury to the grass and young trees is far greater when the bands are not allowed to spread out. The grass is trampled down, the roots injured, and the ground dug up so that erosion is much more rapid and disastrous. Then, too, the sheep have much greater difficulty in feeding. The only animals in the band which can feed with ease are those which happen to be on the outside. Those in the center of the band are crowded together by the continual pressure and are more or less effectively prevented from grazing. The result of this form of management is that the sheep have to travel much further each day than they normally would if allowed to scatter to a reasonable distance and to feed without unnecessary interference. The better class of sheep ranchers are men who own plants of considerable value, are definitely located, and fully recognize the great importance
of preserving the summer range in as good condition as possible. They therefore give orders that the sheep should not be maintained for too long a period in any one camp, and that the camp movers or herders should move the bands of sheep to new camping grounds before any serious damage has been done to the grazing of a given locality. The range is thus preserved in a condition to produce a fair yield of grass from year to year.

Perhaps the chief reason of the unpleasant feelings regarding the summer range has been the presence of tramp sheep. By tramp sheep we mean the sheep which are owned and maintained by men who have no permanent home, or at least, have no sheep ranch. These men employ herders who herd their sheep from place to place wherever they may secure grass. Often they will cross two or three states in the course of a season. These bands, however, are at the present time practically unknown in this State. Under the old conditions, they would go across the range country and have their herds grow and thrive during the trip, but at the present time, owing to the regulations of the forest service, on the one hand, and the settlement of all tillable land, on the other, it is impossible to drive sheep for any distance without very heavy shrinkage and excessive expense.

Summer Management. In some localities which are readily accessible large sheep wagons follow the bands of sheep from place to place and in these wagons the herders carry their necessary utensils, food, clothing, bedding, etc. These wagons may be hauled by two or four horses, according to the conditions. Most of the summer range in Eastern Oregon, however, is too rough for the use of wagons, and camps are moved with pack horses. There are usually two men with each herd, a herder and a camp tender, or a "packer." The herder is in charge of the sheep at all times, and during the day drives them out for a distance of two or three miles and at night works them back to the camp. As soon as the grazing becomes short, the camp is moved for some distance and the sheep are maintained about the new camp as a center for a similar length of time. The moving of the camp is usually done by the camp tender, who also looks after bringing in the supplies, etc. In many of the large sheep-raising districts of the West, one camp tender will look after several camps, but in this State, on account of the roughness and inaccessibility of much of the range, one tender is usually employed for each camp. In the case of small sheep men who own only one or two bands, the owner often tends to the camp, but depends upon hired help for herding.

Watering. The frequency with which sheep must be watered depends upon the succulence of the feed. Where the forage is rank and green, sheep may run for many days without water, but on the other hand, where it is very dry, water will be required at least every day. The summer ranges of this State are for the most part well watered with springs and small streams so that there is no difficulty encountered in giving the sheep water at least every day. There are, however, considerable areas of range land in central and south central Oregon where there is very little water. These ranges are for the most part too dry for use as summer sheep range even if water were abundant; so no at-
tempt is made to use them for this purpose. They are used to some extent during the winter, however, when the sheep depend upon snow instead of water. Up to date practically nothing has been done by the sheep men of this state in the way of providing ponds, wells, or other artificial water systems for these drier districts.

**Salt.** Some men furnish their sheep salt at all times, either giving them salt at regular intervals or keeping salt before them. On the other hand, some may not give any salt at all and claim they get better results by allowing the sheep to find alkali licks than by supplying them salt. Where the alkali licks are abundant, and where this alkali contains as much as 85% common salt, it must be considered as entirely satisfactory, but where the alkali is not very abundant or where it is composed largely of carbonate of soda, sulphate or soda, or Epsom salts, it cannot satisfactorily take the place of artificial salt. There are many districts in Eastern Oregon where there is a great deal of alkali, but these are usually in the lower altitudes, and are devoted to cattle and horses rather than sheep. Most of the sheep ranges, especially the summer ranges, are comparatively free from alkali and it is the general practice among Oregon sheep men to keep flocks well supplied with salt.

**Winter Range.** The sheep are usually kept upon the summer range as long as the weather permits, which is until there is danger of blockade from early fall snow storms. The limit of the safe period in this regard has been learned from experience in the various localities where the sheep industry is carried on. Usually the sheep men drive their herds out of the mountains before any signs of deep snow appear rather than take chances of suffering severe loss. In a favorable season, however, where the weather is good and the feed abundant, there is a strong temptation to leave sheep in the mountains after the time when snow storms may possibly come. This policy is successful part of the time, but every once in a while entire bands are lost from an unexpected storm, and in severe cases the herder will be fortunate if he escapes with his own life. Most of the sheep are brought out of the mountains in this State between September 15 and October 1.

The location of the winter range is naturally chosen for its proximity to the ranch house or to large sheds or hay stacks. In localities where deep snow may be expected in winter, the sheep must be maintained near covered corrals and hay stacks. The winter ranges of this State are for the most part located on the lower hills, plateaus, and prairies, where the snowfall is comparatively light, especially as compared with the mountains. In the lower lands the atmosphere is usually fairly dry and there is a good deal of wind, so that even when there is a comparatively heavy snowfall, the wind will leave a great many bare places. That portion of Central Oregon formerly known as the "Desert," together with the surrounding foothills, comprises one of the largest winter ranges in this State. This region includes southeastern Crook County, and nearly all of Lake, Harney, and Malheur counties, except those parts that are actually mountainous. The other large winter range district lies on the north slope of the Blue Mountains and just to the south of the Columbia basin wheat belt, although
in eastern Morrow county and western Umatilla county the winter range district extends clear to the Columbia River. All of Wasco, Sherman, Gilliam, and Morrow counties were at one time devoted to winter sheep range and were considered about the best in the West, but at the present time this region is practically all devoted to wheat. A large portion of central Oregon and the desert district is now being homesteaded, although very little is actually raising wheat. Besides these larger districts indicated there are various other smaller sections of the country suitable for winter range scattered here and there through Klamath, Grant, Baker, Union, and Wallowa counties.

While all of these ranges are designated as “winter” ranges, it must be understood that to call them spring and fall ranges would give a more adequate idea of their real use. Most of these ranges afford grazing for one or two months earlier in the spring than do the typical summer ranges and in addition they afford a like amount of good grazing during the fall after the danger of early storms has made it necessary to take the sheep out of the mountains. During the winter, most of these so-called winter ranges amount to very little. It is very true that where the grass is allowed to obtain a good growth during the summer it cures down in the fall and makes a very nutritious feed at such times during the winter that it is not covered with snow. On account of the present scarcity of range land of this kind, it is almost impossible to save very much grass for strictly winter use; so that as a rule these ranges afford very little feed during the most severe winter months, but yet they may afford a small amount which together with sage brush and a limited amount of hay will carry the sheep through the winter. At the present time, practically no sheep men attempt to run their sheep through the winter without some hay. The amount allowed varies a good deal, but usually runs from seventy-five to two hundred pounds a head. One hundred pounds a head would doubtless be more nearly the usual average. Sheep men estimate the cost of wintering, including labor, at from fifty cents to one dollar a head. It is quite generally considered that the price of the wool will easily pay for the cost of wintering. Practically no grain is fed to range sheep, although it has been found that at times when feed is very scarce and it becomes necessary to ship or haul the feed for considerable distance, grain is more economical than hay. Especially is this true where it is necessary to haul the feed for several miles out into the range countries. If the sheep have sage brush to nibble on with an occasional bite of grass, one-fourth pound of grain a day will work wonders in pulling them through bad winters. In some of the range districts on the eastern slopes of the Rocky Mountains, the sheep men purchase corn in car-load lots and hold it as insurance against short feed. In favorable years this corn may not be touched and in such a case is merely held over for the next year.

In addition to the sheep that are wintered in the manner outlined above, there are always considerable numbers wintered on the stubble fields and meadows in the cultivated districts that are found in the irrigated valleys of Eastern Oregon. Most of these stubble fields and
meadows are used for cattle and horses, yet they are a considerable factor to the sheep man.

**Weaning the Lambs.** The lambs are ordinarily weaned at the time when the ewes are brought off from the summer range. At this time it is customary to go over the entire flock, and all of the ewes that have broken mouths or bad udders are separated and sold. The lambs are also separated at this time and taken to some distance away from the ewes. The lambs may be sold at once either as mutton or for feeding purposes. Big breeders sometimes divide their lambs in three lots; one lot consists of ewe lambs which they expect to keep; the second lot consists of lambs which are fat enough to ship direct to market; and the third lot consists of those lambs which are too thin to go for mutton and which must be put into the feed lot. In addition, there is sometimes a fourth lot consisting of wethers which are to be held over and run as yearlings the next summer. This fourth lot is growing constantly smaller and in practically all cases consists only of those lambs which show no evidence of mutton blood. Straight Merino lambs are seldom satisfactory for either mutton or feeders in the early stage, and for that reason must be held over for another year.

On some of the best ranges situated close to the railroad it is a practice to ship the lambs to market along in July and August, at which time they will be fat and fine. The ewes will then be allowed to remain on the summer range for a few more weeks. These conditions are found quite commonly in Southern Idaho, but only to a limited extent in Oregon.

**Buildings.** A considerable proportion of the sheep men use no buildings whatever to shelter their sheep, although in such cases they commonly have protected localities where the sheep may be fed during the worst storms and where there is a certain amount of protection during the lambing season. In the more unprotected localities and in those regions where an effort is made to have the lambs come early, large sheds are required. These will usually be very low, but of considerable area and of the cheapest possible construction. A common method of construction is to drive stakes in the ground for posts, putting poles across the top as a framework and covering them with brush. Another popular building material is corrugated sheet iron. Since the hay is usually stacked in the field and hauled to the sheep, the sheds have no provision for the storage of hay. The inside of these sheds are perfectly plain, but with the aid of a number of board panels and the numerous posts supporting the roof, the shed can be divided into many small pens suitable for lambing purposes. Most of these sheds are approximately square in shape, and are enclosed on all sides. In some localities where all of the bad winds are from one direction, the sheds are long and narrow and open to the protected side, but in Eastern Oregon, the enclosed shed is usually preferred.

Corrals are used to a greater or less extent on all sheep ranches. Some sheep men make a practice of having cheap corrals scattered about the ranch and sheep are kept in these corrals at night. This, however, is not the usual practice, and is not permitted in the Forest Reserve. It is customary, however, to have corrals within at least a
reasonable distance so that in case bands of sheep become mixed, it is possible to corral for separation. At the home ranch, corrals are always used to a greater or less extent at lambing time. In addition, the better equipped sheep ranches all have corrals equipped with a "dodging chute." This is a long narrow chute through which the sheep may pass one at a time. At the end of the chute is a small gate so arranged that the sheep may be run into either one or two corrals by simply moving the gate. In separating sheep, men will be stationed along the chute to pick out the ones which go in a certain pen. These will be marked, usually with blue chalk. Then, after they reach the end of the chute, the man working the gate lets the marked sheep in one pen and the remainder in the other. In this way a large flock of sheep may be separated, one at a time, with great rapidity. In picking out ewes which are to be sold on account of broken mouths or spoiled udders, this system is very commonly used. In addition to the above, a certain number of corrals is always necessary in connection with dipping vats and shearing plants.

The most common method of corral construction is by means of light panels of boards. These are wired together at the ends and either put zigzag or are supported by wiring to stakes driven in the ground.

**Age at Which Ewes Are Discarded.** It is a general practice on the range to discard ewes as soon as their teeth show indications of failure. The sheep get a full set of permanent teeth at four years of age and the teeth in some cases begin to fall shortly after, but in other cases are good for several years. The information gathered by the Statistical Bureau of the Agricultural College on those subjects are quite uniform, and by far the larger number of replies indicate that the ewes were discarded at somewhere between six and seven years of age. It would therefore seem the practice of Oregon sheep men to obtain from each breeding ewe five or six lambs.

**Determination of Age of a Sheep.** The age of sheep is determined by the order of appearance of the permanent incisor teeth. The sheep has eight permanent incisors which appear in regular order in supplanting the milk teeth. The permanent incisors are considerably larger than the milk teeth, and they are somewhat broader in shape. The first pair of permanent incisors appears in the center of the mouth when the sheep is about 12 months old. The next pair appears, one on each side of the first pair, the following year. The third pair appears when the animal is three years old and the fourth pair when it is between four and five years old. This method of determining the age of a sheep is quite reliable, although feeding will often cause a variation in the time at which the permanent teeth appear.

**Loss From Wild Animals.** The loss from wild animals is always a serious condition in the raising of sheep on the range. In Western Oregon there is much loss from cougar, bob cat, mountain lion, bear, and coyotes. In Eastern Oregon most of the losses come from the coyotes, with only a very small loss from bear and mountain lion. Some prominent sheep men estimated the losses from wild animals to be about ten per cent per annum for the entire West. A limited investigation carried on by the Statistical Bureau of the Oregon Agri-
culural College indicates a loss considerably less than ten per cent; in fact, the average of the reports received by the Statistical Bureau was 3.7 per cent loss in Eastern Oregon and 4.6 per cent loss in Western Oregon. The number of reports from Western Oregon, however, were so small as to give the figures for this district very little value. The percentage from Eastern Oregon is doubtless more reliable. We note, however, some considerable difference in the estimated loss in the different counties. The sheep men of Grant and Harney county put a high estimate on their loss, their estimate running from 10 to 15 per cent. In any case, the loss is very serious in view of the fact that the men interviewed by the Statistical Bureau were the better class of stockmen; it is quite possible that the real loss is actually higher than that indicated.

No successful method has yet been found to check this loss. It is kept down to the lowest point by constantly guarding the sheep, especially at lambing time, when the herders make a practice of hanging out lanterns, and firing off guns and fire crackers. A feeble attempt is also made to shoot the coyotes. The only place where this problem has been fully solved is in Australia, where in certain parts of the country entire range districts are surrounded by high wire fences. Fencing has been tried by the Forest Service in Wallowa County and in some other places with good success. Not only has the loss from wild animals been practically eliminated, but the other expenses of handling sheep have been greatly lessened. To what extent fencing will be practiced in this State we can not tell, but it is the general opinion among the best informed range men that, since the most tillable land has been put under cultivation, the next big step will be the fencing of those portions suitable only for grazing. There are so far three great obstacles in the way of extensive fencing. The first is the cost, the second is the drifting of snow over these fences in the winter time, and the third is that much of this land is not under private ownership.

Costs and Profits of Sheep Ranching. The cost and profits of raising sheep under range conditions necessarily vary within rather wide limits; the conditions under which the business is carried on also render it very difficult to obtain an accurate account of the cost. The varying price of mutton and wool, moreover, and the varying losses due to storms and other disasters make the profit hard to determine. The special committee appointed by the Tariff Board to investigate the sheep industry in 1910 report the cost of running range sheep in Oregon at approximately $2.00 a head; the average receipts at $2.21 a head; and the average capital invested $4.92 a head, thus making the rate of income on the capital invested 4.7 per cent. This is for the year 1910 only. In some years the profits may have been larger and in others less. It may be also stated that while we have no reason to believe that the Tariff Board made any other than a fair and impartial investigation, it is a well-known fact that the sheep men were anxious to have the profit appear as small as possible in order that the protective tariff might be maintained. The estimate of the expenses seem rather more accurate than the estimates of the income, although both would vary largely with the amount of mutton produced. At
present prices the average range sheep of Oregon will yield wool to the value of not less than $1.00, while lambs in the fall of 1914 were selling in large quantities at from $2.75 to $4.00 a head, according to finish and breeding.

Perhaps the best idea of profits and losses of the sheep industry may be obtained from a study of the financial conditions of men engaged in the business, rather than from any paper estimates. In this regard we must say that the men at present engaged in the sheep industry are reasonably prosperous, perhaps more so than any other class of men engaged in agriculture in Oregon. Many have started with almost nothing and are now well to do, but it must be remembered that a great many have failed. Some have built up a comfortable fortune in the business only to lose it all; a few have lost considerable amounts of money that were put into the business from other sources, but much the larger portions of the losses on record have come out of the previous profits. It must also be borne in mind that the present status of the range-sheep industry is not necessarily comparable with the conditions prevailing in the last ten to thirty years. The cost of the land, feed, labor, and other items has increased much faster than the income from the sheep. About the only way in which the cost of production has been lessened is in the amount of losses. With the more improved systems of management the losses from storms, starvation, and wild animals, are considerably less than in the earlier years.

The number of sheep which can be run on an acre has long been discussed without any definite conclusion. For summer pastures it is generally estimated that there is required anywhere from one-half acre to five acres a head. Investigations by the Statistical Bureau of the Oregon Agricultural College show such variation in the figures obtained that probably none of them are very accurate. On the average, however, it was found that approximately 2½ acres were required to pasture one sheep during the summer season. The average for counties varied from 1 acre in Gilliam and 1½ acres in Grant County up to 3½ acres in Wheeler County, and 4½ acres in Wallowa County. It is very likely that there is some difference in the grazing capacity of the ranges in these different counties, but it is unlikely that it is as great as the difference indicated.

Capital Required. The capital invested in a sheep ranch must necessarily vary within very wide limits. A band is the unit of management and necessarily the business can not be conducted with less than this number. A very good start can be made with 1500 ewes while with wethers a larger number would be needed. The minimum capital required to start in the business might be estimated as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 ewes, at $4 a head</td>
<td>$6,000</td>
</tr>
<tr>
<td>Horses, wagons, and general camp equipment</td>
<td>1,000</td>
</tr>
<tr>
<td>Home ranch capable of raising winter feed</td>
<td></td>
</tr>
<tr>
<td>for 1500 ewes</td>
<td>5,000</td>
</tr>
</tbody>
</table>

Total .................................................................$12,000

This represents about the minimum capital upon which the busi-
ness can be started, but of course a considerable portion of this $12,000 may be borrowed. The cost of the home ranch is the most variable factor. In the early days no land at all was necessary, but at the present time it is very difficult to get along without at least some land. The price given would usually purchase a ranch that would furnish hay for 1500 ewes. A larger amount would, perhaps, in addition to furnishing the necessary amount of hay, give a good deal of winter and summer range. As a rule, however, ranches handling only one band of sheep will seldom cost more than 10,000 to 12,000 dollars.

Where large numbers of sheep are required, the capital invested is pretty much in the same proportion, although perhaps hardly as great. By far the larger number of sheep men in Oregon, however, are running only one band.

**FATTENING RANGE LAMBS IN WINTER.**

The fattening of range lambs in winter has become an important industry in the irrigated sections of the West where good hay and grain are abundant. Since both hay and grain are required for the best results, lambs cannot be fattened profitably where either one is lacking or is excessively high in price. A comparatively dry climate is also very helpful. Where there are a great many wet storms, sheds and barns are essential; and the cost of such barns takes off a large portion of the profit.

**Lambs.** The lambs used for winter fattening are lambs that are brought in from the range in the fall or early winter and that have not had good enough grass during the summer to make them fat. Where the range is extra good, lambs will become fat and attain weights of 75 to 80 pounds before fall; they are thus suitable to go directly to market. Where the range is not so good, the lambs will not be fat, and will weigh approximately 60 pounds each when they come off the range in the fall. Such lambs, while rather small and lacking in flesh, are in most cases very strong and vigorous, and when put on full feed make rapid gains. When fat, moreover, they sell at top prices, even though they may look somewhat leggy and rough. Range lambs that are born very late in the season and that perhaps have very poor feed, come off the range in the fall weighing 40 to 50 pounds each. Such lambs are usually known on the market as “pewees” or “peanuts,” and sell for rather a low price. These lambs are not desirable for mutton purposes, of course, and are badly in need of more weight and finish, but they are usually rather delicate and too light to be profitable feeders. Unless they are known to be fairly thrifty, and the feeder has an abundance of rich feed, they had better be let alone. Generally speaking, the ideal feeder is the thrifty fleshy range lamb, weighing 60 pounds in October or November. The more mutton blood which these lambs carry the better. Lambs with heavy wrinkled pelts are objectionable, as they do not gain rapidly and sell to a disadvantage. The black-faced lambs are preferred, as the black faces are an indication of Shropshire, Hampshire, or Oxford blood.

Heavy native lambs from the Willamette Valley are unsuitable for winter fattening; since if they have had any sort of care they will be too heavy to meet the market demands, and where they are light
enough it will be because they have been stunted or infested with parasites.

**Rations.** The standard daily ration for lambs weighing 60 pounds at the start would be about 3 pounds of good alfalfa hay. This would, of course, be all that they could be made to eat, with the stems and waste portions cleaned out and fed to other stock. If the lambs have been in the feed lot for perhaps two weeks, and are thoroughly accustomed to their surroundings, a small amount of grain is given, usually about one-fifth to one-fourth pound a day. The grain is then slowly increased until they are getting one pound a day. It will take at least 4 weeks to make this increase. In many cases the full ration of 1 pound a day is reached not until practically the end of the feeding period, the ration being gradually increased through the entire time. The lambs still get all the hay they will eat, but with 1 pound of grain a day they will not usually eat over 2 pounds of hay.

Corn is perhaps the best grain, but it is not available in any of the principal lamb-fattening districts of the West except in Eastern Colorado. In this particular district the lambs are all fed alfalfa hay raised on the farms, together with corn shipped in from Kansas and Nebraska. The finest lambs produced in America come from this section. In Oregon, oats, barley, bran, and screenings are commonly used. Of these, screenings are very variable in their cost and in their value, but in most cases will produce just as rapid gains as barley, though requiring larger quantities. Where a lamb would be fed one pound of grain a day, he would be given perhaps one and one-fourth to two pounds a day when screenings are used. If the screenings are very chaffy, as much as three pounds a day are sometimes fed. In this case, no hay is used, since the chaff and cob in the screenings afford the necessary roughage.

While alfalfa is the hay most commonly used, clover hay, free from weeds or other grass, and well cured, will give equal results. Prairie hays and wild hays of various sorts are seldom used, and in practically no case do they give the same satisfaction as alfalfa. The Wyoming Experiment Station has made a long series of tests of alfalfa in comparison with prairie and wild hays, and they have found that with the wild hays so much more grain was required for one hundred pounds gain that the cost of this grain was equal to the cost of both grain and hay where the alfalfa was used. It is evident, therefore, that it does not pay to use this kind of hay at all where alfalfa can be obtained at a reasonable price.

The practice of cutting alfalfa hay for lambs is growing rapidly throughout the Northwest. The alfalfa is run through a cutter that chops it up in lengths about one-fourth of an inch. After being cut, the hay may be fed direct, stored in barns, or stacked in the fields. Some feeders make a practice of stacking their hay in the field at harvest time and then during the later summer or early fall go into the field with a big chopper and traction engine, chop the hay and re-stack it in the field. This chopped hay stacks well and the stacks are said to turn moisture as well as those made from the long hay. Grinding alfalfa is practiced to some extent, but this process requires much
more power than chopping and seems to add little improvement. There are a good many large establishments that make a business grinding hay, but these firms ship out their products and usually sell it under fancy names to the dairymen.

The chief advantages of chopping are ease of handling and freedom from waste. Where long hay is used, it is always necessary to clean out the stalks and leavings, since the lambs will not eat these until they become quite hungry. Where the feeder has a considerable amount of stock, sheep, cattle, or horses, this refuse may be fed to advantage, but where he has no outlet for refuse hay, it is a dead loss. With the chopped hay, however, the entire amount is consumed without waste or loss. Another advantage is that the grain may be mixed with the chopped hay. In this manner lambs that are not used to this grain may be put on full feed in the shortest time and with the least danger.

It is not usually claimed that chopping or grinding hay has any great effect upon its digestibility or feeding value; that is, the professional lamb feeders, who are handling it on a large scale, do not make such claims. Firms grinding it and selling it under fancy names go so far as to claim, in some cases, that the ground hay is fully equal to, if not better, than the common grains.

Grain for sheep does not need to be ground, cooked, or treated in any way. There is no class of animals which is better able to grind its own grain than sheep. There is a possible exception to this rule, however, in the case of old ewes with bad teeth.

Near the sugar beet factories, considerable quantities of beet pulp are fed. This pulp is given in quantities somewhat less than the lambs will consume, along with hay and grain in the usual manner. Where the pulp can be fed to the sheep at the cost of around $1 a ton, it will pay a very nice profit, but since it is largely water, it must be bought at a low price and not hauled any great distance. At the present time there is no beet pulp produced in this State.

**Length of Feeding Period.** The time lambs are ordinarily kept on full feed in winter is about one hundred days. This period varies very little in the different feeding sections. A shorter period than this commonly does not put on sufficient gain to pay a profit, while a longer feeding period is unnecessary, as good lambs will be sufficiently fat in one hundred days to bring a good price. There are a number of large feeders in the West, however, that do not feed for any regular length of time. These men buy sheep of all kinds, sell the fat ones for mutton, and put the others in the feed lot. These sheep that go into the feed lot will necessarily vary a great deal in condition, and some will be ready for market long before the others. The feeder will therefore go through the bunch a number of times during the winter and top out the best to send to market. Handled in this manner, some of the sheep will not remain on feed over thirty days, while others will remain on feed as much as three or four months.

**Gains.** Lambs fed as outlined above may be expected to gain from .2 to .3 pound a day, an average of one-fourth of a pound. This would mean a gain of 25 pounds a head in 100 days. Gains of less
than 20 pounds during this period are unsatisfactory and the lambs are growing rather than getting fat. Gains of over 30 pounds are extraordinary and are obtained only with well bred mutton lambs and choice feed. If the lamb weighs 60 pounds at the start and gains 25 pounds during the feeding period, he will then weigh 85 pounds, which will be an ideal weight for a fat lamb. The buyers like to have the lambs as small as they can get them, providing they are sufficiently fat. About 85 pounds is considered the best weight, since a lamb can easily be made fat at that weight and make it unnecessary to hold him until he becomes much larger, while on the other hand lambs lighter than 80 pounds are rarely very fat.

Cost of Gain. If the average daily ration for a lamb may be estimated as one-half pound of grain a day and 2 1/2 pounds of hay, and the daily gain at 1/4 pound, the cost of 100 pounds of gain will be about as follows:

| 1,000 pounds of hay at $8.00 | $4.00 |
| 200 pounds of grain at $1.25 | 2.50 |
| **$6.50** |

At the beginning of the feeding period when the lambs are thin and are only getting hay, the cost of gain will be somewhat less than that stated above; but toward the end when they are getting more than the one-half pound of grain, the cost will be somewhat higher. In any case, however, the cost of gain will ordinarily be more than the selling price of the lamb; but because the lamb is fat he will sell for more a pound than at the beginning of the feeding period, and will thus yield a profit in spite of the high cost of feeding. For example, a 60 pound lamb at 5c would cost $3.00; 25 pounds of added weight at 6 1/2c would cost $1.63, thus making the total cost of the feed and lamb $4.63. If sold at the original price a pound, the lamb would bring $4.25, thus making a loss of 38c; but because he is fatter he will usually sell on a steady market for close to 1c more than in the thin condition, or in this case for 6c a pound; thus making the selling price $5.10 a head and showing a profit of 47c a head. At this profit, the business will pay splendidly, but as feed advances in price, the profits rapidly disappear. A drop of 50c a hundred pounds in price of the sheep, moreover, will wipe off the profit, but a raise of 50c a hundred pounds will double it. The profit for any particular year, therefore, depends very largely upon the market and no one knows what that will be until the sheep are weighed and sold.

Method of Feeding. It is essential in fattening lambs that the feed and hay be fed in such a manner that fresh hay can be put in and stems and refuse taken out without interfering with the lambs. The method most widely used is to have the lambs fed through a fence made of panels in such a manner that the hay can be put on one side and the lambs on the other. Such panels are ordinarily made out of 6 inch fence boards with about 7 inch space between each board. The load of hay is driven on one side of these fences and dumped off on the ground. Afterward it is pushed up to the fence. The wagon never goes inside the lot with the sheep. Very commonly the fence is made
in a zigzag, instead of straight, line. This gives the lambs more feeding room on the same ground. Where several thousand are being fed, the feed lots are commonly a series of long narrow pens fenced with zigzag panels. The sheep are kept in alternate pens and the hay in the other pens. With grain, it is quite essential that the feed be put in the boxes before letting in the lambs. Otherwise it will be impossible so to distribute the grain that each will get his fair share. The grain is fed in long narrow troughs about a foot from the ground and with a bar along the top to keep the lambs from jumping into them. These troughs are put into extra pens and the grain carefully scattered along the entire length of the troughs, the lambs are then all turned in at once. Where there are a large number of pens of lambs there will be only one extra pen, but there will be feed troughs in all. Grain is put in the first pen and the lambs turned in from Pen No. 2. Grain is then put in No. 2 and the lambs from No. 3 put in that pen and so on until all are fed. To attempt to feed by driving teams into the lot with the flock is only to make trouble.

**Shelter.** The ideal feed lot is located in a place sheltered by nature from the prevailing winds and storms, and having a small stream for the water supply. In such localities sheds are hardly necessary. In fact, very few lambs are fattened under shelter. Where the feed lots are in exposed positions simple sheds of rough boards will be necessary. This will be used only for shelter in times of storm, and the hay racks and grain boxes will all be out in the open.

**Dipping.** It is becoming a very common practice to dip all sheep before putting them in the feed lot. The chief purpose of this is to rid them of ticks. If allowed to run out on the open range in the winter, the sheep are not usually seriously troubled with ticks, but if they are crowded together in the feed lots, especially if under shelter, the ticks multiply with the greatest rapidity, and in a few weeks there are millions of them. On this account many of our most progressive sheep men make a practice of dipping all sheep before putting them in the feed lot. They declare that they "can not afford to feed ticks."

**Feeding Wethers.** Wethers are fattened in the same way as lambs, although not on so large a scale. They will require on the average about 40% more feed, a larger portion of which may be hay. In spite of this larger feed the daily gain is about the same as for lambs, or
possibly a little less. The cost of feeding, therefore, will be about 40% greater, and the margin required correspondingly increased. For these reasons, there is not usually the profit in feeding wethers that there is in feeding lambs.

Feeding Old Ewes. Large numbers of old ewes are sold in the stock yards every fall at low prices, and in many cases offer attractive opportunities to the sheep feeder. It is very essential, however, that these old sheep have good teeth. A large portion of these old ewes are put on the market because their teeth are bad, and they are no longer profitable on the range. Such ewes will not pay for feeding; in fact, they commonly will not get fat at all, and all of the feed put into them will be wasted. On the other hand, however, if the teeth are fairly good, they may often be profitable. Often the teeth are too bad to allow the ewes to be kept on the range, but are still good enough so that they will fatten when put on good feed. In general, fattening old ewes is rather risky, and such ewes should not be bought for feeding purposes without a careful examination of their mouths. The rations required for ewes are about the same as for wethers, though in some cases slightly less. Grinding the grain will sometimes pay in this case but not usually. The gains will vary from nothing to one-fourth pound a day, and the cost is usually somewhat higher than with wethers.

SPRING LAMBS IN WESTERN OREGON.

Raising spring lambs is the most promising branch of the sheep industry for the Western Oregon farmer. It is adapted to any climatic conditions, does not require great capital or skill, builds up the soil, fits in with the most approved rotations, and lastly, is in no great danger of being over-done. The raising of spring lambs, as herein described is therefore an industry for the many rather than a specialty for the few.

Farm and Equipment. Among the farms suitable for the raising of spring lambs, we may include practically all of the general hay and grain farms of Western Oregon. The farms where grain, clover, vetch, and rape are grown are the farms for spring lambs. Especially is this industry suitable for those farms which have had their fertility exhausted by continuous grain cropping. The industry requires about the same kind of a farm as dairying, but accessibility to market is not quite so important and more grass land can be used. As compared with dairying, lamb raising does not require as great a capital and is not so laborous and confining. It is just as profitable as ordinary dairying, but we can not say that lambs will pay quite so large a profit to the acre as dairying conducted in the best manner and with high-class cows. The ideal sheep farm will include much rolling, well-drained land that will stand a good deal of tramping. Such land can be pastured practically the year round, even when sown to such crops as winter vetch. Of course this is a good type of land for any purpose, but is especially good for sheep. The fine sheep of Polk and Yamhill counties are very largely grown on such land.

No expensive equipment is needed in the way of buildings, etc. If one has room to store his hay, the sheds necessary may be constructed
with very small expense. A shed 18 feet wide and 60 feet long, closed on three sides, may be erected at a cost of about $30 to $35. Such a shed will provide ample protection for about 40 to 50 ewes, but of course will not provide storage room for hay. The College recently constructed a portable sheep shed, the dimensions of which were 28 feet by 80 feet. This shed is constructed in 8 sections, and each section is built on skids so that it can be moved to any place desired. It can even be moved through a 12 foot gate. For construction of each section see Figure 7. Each section is 20 feet long and 40 feet wide and can be constructed at a cost for material of about $15 or $16. The great advantage of this shed is that it can be moved from place to place, and can be set up in one shed, or can be divided into two, three, or four.

Bill of lumber for section of portable sheep shed:
- Two pieces 4”x4”x20’ for skids.
- Three pieces 4”x4”x8’ for posts.
- Three pieces 4”x4”x4’ for posts.
- One piece 2”x8”x18’ for front plate.
- Two pieces 2”x4”x18’ for back plate.
- Ten pieces 2”x4”x16’ for rafters.
- Two pieces 2”x4”x10’ for braces.
- Two pieces 2”x4”x6’ for braces.
- Eight pieces 1”x12”x20’ for roof.

Every sheep shed should be well provided with panels and feed racks. Panels can be cheaply and easily constructed out of 1x3 inch lumber. They should be about three feet high, and should be of such length that they will fit in several places of the shed, so that pens can be made in whatever part of the shed desired. Panels for lambing pens should always be kept on hand, and ready for use during the lambing season. These panels should also be made of 1x3 inch lumber, and each panel should be 3 feet wide and 4 feet long. Two
of these panels are hinged together, so that they will open and close, forming the letter L when open. The use of these panels will be taken up in connection with the lambing.

There are various kinds of feed racks which may be used for feeding sheep; namely, a hay rack, a grain rack, or a combination of the two. A little better success is had when the hay and grain racks are separate. All racks should be so constructed as to permit of easy cleaning. Of all farm animals, sheep, perhaps, are the most particular about their food. They will not eat from dirty racks.

**Flushing the Ewes.** About a month or so before the breeding season begins, the ewes should be flushed. The term “flushing” means bringing the ewes from a thin condition into a good, strong, vigorous condition. Perhaps this can be brought about in no better way than by feeding good succulent feed such as rape, kale, or green clover. Of these, rape is the best. The ewes are commonly kept on dry pastures during the summer months so that when put on this rich green feed, they gain very rapidly. There are several advantages to be gained by flushing. First, if the ewe is in good vigorous condition she will be better able to withstand disease than if she goes into winter quarters in a thin condition. Second, the percentage of lambs is slightly increased, due to more vigorous condition of the ewe. Third, the ewes will breed more readily, thus shortening the lambing period.
Breeding Season. Before the breeding season begins, the ewe flock must be culled. All ewes that have not proved to be good producers or good mothers and all ewes with broken mouths or with spoiled udders and teats, should be sold to the butcher while in good condition. The work of culling should be done by the shepherd himself, as he knows the actual performance and condition of each ewe. The ewes, before the ram is put to them, should be tagged. This means clipping all surplus wool from the end of the tail. This aids the ram in mating, saves his vitality, and also insures less barren ewes in the flock.

The ewes should be bred during the months of September and October. As ewes carry their lambs five months, this will make the lambs come in the months of February and March, which is about the proper time for a good commercial lamb. Lambs earlier than this require extra care and expense, while later lambs do not mature before dry weather sets in.

Figure 9, Combination Grain and Hay Rack.

Not more than fifty ewes should be allowed to one ram in a season. On many farms it is customary to turn the ram with the flock of ewes when breeding is to begin. This practice, though permissible, is not as good as the method where the ewes are bred by hand coupling. In hand coupling the ram is turned in with the ewes night and morning. At these times the flock is watched closely, and as soon as a ewe has had one service she is taken away so that the ram will pay attention to other ewes which may be in heat. The ram should not be allowed to serve more than three ewes each morning and three each night.

Some of the advantages of hand coupling can be enumerated as follows:

The vitality and vigor of the ram is saved, as each ewe gets one service instead of half a dozen.
The ram is not allowed to give all his attention to one ewe, thus neglecting other ewes which might be in heat.

The shepherd has a chance to find out whether or not his ram is a good breeder, as ewes which do not become pregnant from the first service will come in heat again.

The shepherd is able to keep a record of the date of breeding of each ewe, and hence knows the date when she is to lamb.

**Wintering the Ewes.** The ewes should have a great deal of range during the winter. Close confinement either in barns or open lots will not do. They should have access to an open shed under which they will be given their hay and such grain as may be necessary. Elaborate barns are not only unnecessary but are positively harmful. Sheds in Western Oregon should be open on the east side. Some very successful sheep men do not use sheds at all, but their sheep have much range, and a good deal of natural shelter, and do not stand in the mud.

It is impossible to give any exact rules for feeding during the winter. Sometimes where a few ewes are given the run of large fields and pastures, they will pick up enough feed to keep them nicely. There will be found all intermediates between this condition and the conditions where ewes must be given all of their feed in the form of grain and hay. In the latter case the hay should be good legume hay. Timothy or cheat hay is poor stuff in such a case, and its use requires an excessive amount of grain. We ordinarily expect to feed a little grain where the ewes get no pasture. A mixture consisting of one and one-half parts oats to one part bran is a good feed for pregnant ewes. With ordinary hay, a daily ration of about one-half pound of the mixture for each ewe a day is sufficient; whereas, with real poor hay as much as one pound daily will be required. With good alfalfa or clover hay, no grain is needed until about a month before lambing. At this time it becomes necessary to feed a little grain or to increase the amount of hay to insure a good milk flow. One of the greatest difficulties of sheep raising is the winter feeding of ewes. The shepherd either feeds them too well and does not exercise his ewes enough or he goes to the other extreme and exposes them to storms with little or no feed. Where the ewes are fed heavily with little exercise, particularly if a great deal of bran is fed, the lambs, when they come, will be of such enormous size as to make lambing difficult, often causing the death of a number of ewes. Where the ewes have been exposed to storms with little or no feed, they have no milk for the lambs and will not own them. Pregnant ewes must have, so far as possible, natural conditions. They should have enough food of the right nature to nourish the growing foetus without stimulating too much development of the bone. At all times they must have an abundant opportunity to exercise and get fresh air.

Water is another important item in wintering ewes. They must have good clear water, which they can reach without wading in the mud. Where ewes have to wade in deep mud to get to water, they will not go until they are very thirsty. As a result, they do not thrive, in spite of heavy feed. Sheep are so particular about mud that one must be very careful in this regard, and in the wet Western Oregon
winters it is hard to find a natural stream that is suitable for watering sheep. Where streams are used for watering, conditions may often be improved by making out of gravel or boards, an approach to the watering place.

The attention given to the ewes in this season of the year should be constant. Turning ewes into a back pasture and never going near them is poor policy. They are subject to accidents which may seem trivial, but which kill many sheep. Of these, the most common is getting on their backs in a dead furrow where they remain helpless waiting for death or rescue. A successful shepherd must early form the habit of counting his sheep, in order that he may know when any are missing.

**Wintering the Ewe Lambs.** Wintering ewe lambs is about the same as wintering breeding ewes. Where the flock is out on pasture and is getting no grain or hay, the ewe lambs may be run with the older ewes; but where grain is fed, the lambs must be kept separate, as the older ewes will crowd them away from the feeding troughs, and as a result the lambs do not thrive as they should.

**The Ram.** A ram is not sufficiently developed or fit for service until he is a yearling. Sheep breeders make a serious mistake by using a ram lamb for breeding. A lamb used for service does not get his full development, and if heavily used is quite apt to become a non-breeder later in his life.

The ram should be kept away from the ewe flock except during the breeding season. If allowed to winter with the ewes, he is apt to bunt the pregnant ewes and may cause a case or two of abortion. He should be kept in such a place that he will get plenty of exercise and fresh air. If he has the company of another ram or a wether, he will thrive better than if kept alone. A small amount of grain mixture of two parts oats to one part bran, together with some good clover, vetch, or alfalfa hay, and a few roots or a little corn silage will keep him in splendid condition. Mangels or sugar beets should never be fed to rams and wethers as they cause bladder trouble. During the summer, if the ram has good pasture, he needs no grain allowance, but a month before breeding season begins he should be given some grain. Best results are obtained where the ram is in a good vigorous condition. There is great danger, however, of having him too fat for breeding.

**Lambing Time.** At lambing time the ewes should have access to a good shed. They should not be confined. If one has good well-drained land that will stand trampling, this may be seeded to rape and clover, and the ewes run on this during the lambing season. Unfortunately, such land is not available on all the sheep farms of Western Oregon. Where the ewes are strong and healthy, they will need little attention at lambing time as compared with the attention required by range ewes. Before the lambing season begins, the shepherd should provide himself with panels about four feet long and three feet wide. Two of these panels should be hinged together so that they will open and close, forming the letter “L” when open. These panels are made into pens, 4 feet by 4 feet, by fastening one set in the corner of the
barn so that the walls of the building form two sides and the panels the other two. After the first pen is made the next is made in the corner formed by the first one and the wall. In this manner a row of small pens may be made very easily and the panels, when not in use, may be stored in a very small place. The ewes at this time should be carefully watched, and any ewe showing signs of lambing soon, should be carefully shut up in one of those pens. If she has been properly fed and cared for during the winter, little difficulty will present itself during lambing. She should be watched carefully to see that the lamb is presented properly and to see that she owns her lamb after it is born. The latter difficulty presents itself very commonly where the ewe has little milk. With real stubborn ewes stanchions often have to be used. These are made by driving stakes into the ground one on each side of the ewe's neck. In such a case it is well to feed the lamb a little cow's milk until its mother's milk-flow is started. The ewe and her lamb should be penned up until the proper maternal relations have been well established. This system of penning the ewes about to lamb will prove valuable especially where the ewes drop twins or triplets. In such a case if the ewe were left with the flock she very likely would disown one of them, because the first lamb born usually is the strongest and would wander off looking for its first meal while its mother was giving birth to the other lamb.
or lambs. It would thus be surrounded by other ewes and its mother would lose its scent and consequently disown it. Nearly every year there are one or two lambs that die. In such cases the ewes may be induced to become stepmothers. The method of making the ewe own a strange lamb has been discussed in the chapter on lambing of range ewes.

Growing the Lamb. In order to get a good cheap lamb in Western Oregon, he must be grown within the months of March, April, May and June. These are the months during which rich green feeds are the most abundant. Of these months, April and May are the best and the more growth that can be made during these two months the better the lamb and the cheaper the ultimate cost.

To get good results on the general farm in Western Oregon, the lambs must be grown on sown pastures such as vetch and oats, vetch and rye, clover, rape, or rape and clover. Sheep are commonly kept on the general farms for scavenger purposes but we should not expect to use the lambs in this way. The common system is to have a few sheep to clean up the fence corners, stubblefields, etc. The lambs get no care and slowly mature into scrawny brutes of little value. If, instead of raising twenty-five lambs in this manner, the grower were to raise fifty in the way we are advocating, he would derive a much greater profit and the ewes could clean up the fields after the lambs were gone.

It will be necessary to have several fields for the lambs in order to get the best gains and in order that each kind of pasture may be utilized in its proper season. It is also especially necessary to have fresh pastures on which to finish the lambs. Often we find that the lambs do fine until about ready for market. Then the pastures begin to fail and the lambs, which were so nearly done, begin to go backward, and almost before we are aware, the dry season has come on, and we can not get these lambs ready for market until fall. Before this time they are too coarse and heavy to bring the best price and have cost more money than they are worth. It is therefore essential that the ewes and their lambs be supplied with the most liberal pasture throughout the growing season. In order to afford a number of different fields, portable fences have often been used as illustrated in Figure 11. These are very satisfactory, but are somewhat troublesome to move. One common form of portable fence is made of light panels, supported at the ends by triangular supports. It has been found, however, that a regular fence of 32-inch woven wire with driven posts can be taken down and set up about as easily as any of the regular portable fences, and that it is a better fence when put up.

The Use of Grain will depend upon various factors, such as the prices of grain and of mutton, and the richness of the pastures. Ordinarily no grain need be used, but when mutton is a good price or when grain is rather low some grain may be used with a profit. Lambs given grain will grow faster and finish better. In feeding grain, it is a good plan to teach the lambs to eat early in life; that is, when they are two or three weeks old. They should have a "creep" so that they can get the grain they need without interference by the ewes. A
"creep" is a panel of fence arranged with upright bars so spaced that
the lambs can go through but the ewes cannot. A mixture of two
pounds of wheat bran, one pound of oats (crushed oats preferred),
one pound of finely ground corn meal, and one-half pound of oil meal,
is perhaps the ideal feed for young lambs. Another place where grain
is very necessary is where the pastures are beginning to fail a little
before the lambs are quite ready to market. A liberal feed of grain
for a few days will often put the lambs in marketable condition and
save the necessity of carrying them through the dry summer. Of
course, the pasture should not fail before the lambs are ready, but

![Diagram of portable sheep fence.](image)

Gains. Lambs handled in the manner outlined above should gain
one-half pound a day while under favorable conditions, and with extra
feed and care the daily gain may be close to one pound a day. When
the gain is less than one-half pound a day, the feed is getting a little
scanty, and the lambs are not quite as thrifty as they should be.

Castration and Docking. All male lambs not intended for breed-
ing purposes should be castrated. As a rule, at about the age of three
months the buck lambs begin to know that they are males, get restless
and not only fail to gain but actually lose the flesh put on in an early
period. As a result, ram lambs come on to the market with thinner
flesh and with less choice carcasses than do wether lambs raised under
the same conditions.

Castration is a simple operation involving little risk when done
with ordinary care and cleanliness. It should be performed when the lamb is from one to two weeks old. The operation consists in cutting off the lower end of the scrotum and drawing out the testicles, together with the adhering cords. A little disinfectant should be poured into the holes from which the testicles have been removed. Castration should be done in the morning of a nice bright day.

Docking is also another neglect common to sheep farmers. Failure to dock causes a loss of 25 to 50 cents a hundred pounds when the lambs are sold, depending on the amount of dirt collected. Tails are unnecessary appendages on sheep, and what blood goes to nourish the useless tail would add, no doubt, to the growth of the rest of the body.

There are several ways of docking lambs; namely, chopping off the tails with a mallet and chisel, cutting off with a good sharp knife or removing with hot pinchers. Of these three methods the latter is the most preferred as there is very little loss of blood where it is practiced. In any case, the tail should be removed so as to leave a stub, or dock, of one to one and one-half inches. This operation should be performed on ewe lambs at one or two weeks of age, and with ram lambs, it should follow from five to seven days after castration. On large ranches, to save time, both castration and docking are performed.
at one time, but on smaller farms better results are obtained where they are done separately. The loss from castration and docking should not be more than one lamb in five hundred.

**Marketing.** Spring lambs should be marketed when they get fat. This will ordinarily be at a weight of somewhere between 50 and 80 pounds. We would say that about 60 pounds is the proper market weight. There should be no great difficulty in getting a lamb in a good market condition by the time he weighs 60 pounds.

Very early spring lambs for the fancy trade may be dressed on the farm and shipped to Portland by express, but with the class of lambs under discussion they will more commonly be shipped in car-load lots to the stock yards. These lambs are young and tender, and great care must be taken to see that they get the least possible rough treatment on their journey. The lambs are not to be weaned, but are to be taken directly from their mothers to market.

**Dry Ewes.** After the lambs are shipped to market, the ewes should at once be turned onto proper pasture. Such dry feed will aid very much in drying up their milk flow and preventing spoiled udders. Aside from this, the ewes would get too fat if kept on rich pastures after the lambs are weaned, and the expense of keeping them would be too great. Fortunately the requirements of the ewes fit in exactly with cropping conditions on the Western Oregon farm. The lambs will be sold at a time when the fields are getting dry. The clover, vetch, and rape which were so good earlier in the season, become woody, and green feed is rarely available. The ewes should therefore be turned out on the drier hill pastures, on the meadows after the hay is cut, or on the stubble fields. In this way, they will not only get the feed which is best for them but will get it at the least cost.

**Dipping.** There is not much scab in Oregon, but ticks are very common. Ticks rarely kill a sheep, but often they keep a whole flock from making any gains. It should therefore be the rule to dip the entire flock in the spring soon after shearing. They should be dipped twice about ten days apart. Late in the fall they should be carefully examined; and if they show any signs of ticks whatever, they should be dipped again. A few ticks will do no damage for a while, but they multiply during the winter and there will soon be millions of them. Late in the winter and early in the spring, is the season when the ticks do the most damage. To kill them, any of the standard sheep dips will give good satisfaction, if made up according to directions. The water does not always need to be warmed for dipping, but a warm, dry day is needed for the work. In case the water is very hard, it may be softened by adding ½ ounce of spirits of tar and ½ pound of soft soap in a 10-foot vat. Do not exceed this amount, however, as suds are apt to form too abundantly and cause choking. In case the water is still too hard, add ¼ pound of borax.

**PURE-BRED SHEEP.**

The management of pure-bred lambs in the Willamette Valley is practically the same as that outlined for spring lambs up to the time of marketing. Instead of marketing in May or June, pure-bred lambs, especially rams, must be held until about September before selling.
Along in June, therefore, the lambs are weaned and the ewes turned on dry pasture as previously outlined. The lambs now require the most particular care, because fields dry up very rapidly during the following two months and it is almost impossible to get good green feed after July 4. One must do his best, however, and provide as much clover or rape pasture as the lambs can use. Grain is a necessity at this time, except under the most favorable conditions. Ram lambs are commonly sold on contract for September delivery at weights of not less than 100 pounds. Unless the lambs are rightly managed they will not weigh this much. Another source of danger is internal parasites, such as tapeworm. Changing to fresh pasture tends to prevent the spread of such trouble, while rather liberal feeding of grain makes the lambs stronger and more able to withstand their attacks. Good pure-bred lambs are worth from ten to fifteen dollars a head in bunches. Picked animals of show quality are worth from twenty-five dollars up.

In Eastern Oregon, many pure-bred sheep are raised on the range. These sheep are handled in the same manner as outlined for range sheep, but are given the better ranges and more winter feed. The lambs are not as early as those in Western Oregon and do not mature as rapidly. Their slowness of maturity puts the range breeder at a disadvantage as compared with the Western Oregon farmer, but any such disadvantage is largely offset by the lower cost of feed. The range-bred rams are in strong demand and sell well. Generally speaking, Western Oregon is the best place for producing rams of the mutton breeds, while Eastern Oregon is the place for the fine wools. Oregon is the home of some of the finest flocks of Cotswolds, Lincolns, and Rambouillets in America. As a breeding ground for Cotswolds and Lincolns, Polk and Yamhill counties probably have no equal outside of England.
HOT HOUSE LAMBS.

Hot House Lambs, or “winter” lambs as they are sometimes called, are strictly a fancy product. Unlike the raising of spring lambs and range lambs, this is an industry for the few rather than for the many. Hot house lambs make the most expensive mutton we produce, and therefore must have a fancy price and a limited production. To raise hot house lambs successfully one must be located so that he can get dressed lambs to Portland by express in a few hours. He must have an abundance of rich hay and grain and plenty of good shelter.

The lambs should be born in October or November which means that Dorset ewes must be used as other breeds will not bring lambs at this time of the year with sufficient regularity. After the lambs come they must be kept under shelter and fed in the best possible manner. The ewes must be fed plenty of grain, especially bran, oil meal and other feeds which encourage milk flow. The hay must be of the best quality and a good deal of kale must be used. Just as soon as possible the lambs must be taught to eat a little grain. This will be when they are about 10 days old. There should be a creep arranged so that the lambs may have all the grain they wish, separate from the ewes. The best grain is a mixture of 2 parts bran, 1 part oats, 1 part corn meal, and one-half part oil meal. The troughs must be cleaned out at each feeding. With such careful attention the lambs grow rapidly and sometimes in January or February they are ready for market. They are too young and tender to ship alive so they must be dressed and shipped by express. They are either sold direct to the large hotels or are handled by produce commission men. In either case it is usually customary to arrange for their shipment beforehand and to ship a few each day rather than all at once. The prices for such lambs are very variable, but quite high, ranging from ten to twenty cents per pound. Eastern growers figure that a good lamb should be worth $10. In Portland, however, there hardly is any standard price. The cost of production is also high, but the growers who take care of their stuff and produce top lambs make a nice profit. There is no demand at all for winter lambs that are not fat and fine. The desired live weights are from 30 to 45 pounds.

WOOL PRODUCTION.

The production of wool is so intimately connected with the raising of mutton that the two cannot be separated. In the raising of beef cattle, the production of milk is almost entirely overlooked, while in the production of milk the beef end of the industry is of practically no importance. The sheep, however, is strictly a dual-purpose animal, and in practically no case has it proved possible to raise sheep for either mutton or wool exclusively. According to the report of the Tariff Board for the year 1910, the average receipts for each sheep in the United States west of the Missouri River was $2.44. Of this amount, $1.05 was derived from wool and $1.39 from other sources; thus for all the sheep west of the Missouri River, which includes approximately seventy per cent of the sheep in the United States, the income from wool amounts to 43% of the total gross income. This proportion varies a good deal when we compare different flocks. It perhaps varies some
with the different states of our Northwest, but in no case do the receipts from wool exceed the receipts from other sources. In the states east of the Missouri River, the proportion of the income derived from wool is somewhat less. At the same time it is a large and important item. In much of our western country, the ranchmen say that they are raising sheep for wool, while some farmers in the eastern states will say that they are raising sheep for mutton. Such statements of course must not be taken literally. It is true that many of our western ranchmen manage their sheep primarily to get the greatest possible production of wool, and take such income from other sources as they may happen to get. In the management of their flocks and in the selection of their sheep, these men consider the quantity and quality of the wool as a prime factor, while on the farms of the eastern states the farmers manage their sheep and select breeding stock almost entirely from the standpoint of mutton production. It has been found, however, that neither of these extremes works to the best advantage. Sheep breeders have so far been unable to develop a strain of wool-producing sheep which will produce enough more wool than the average sheep to make the cost of mutton negligible, nor have they been able to produce a strain of mutton sheep of sufficient merit from that standpoint alone to enable them to neglect the wool end of the industry. A detailed study, by the Tariff Board, of the books of a very large number of northwestern sheep raisers shows, however, that on an average those sheep men who derive the larger percentage of their income from sources other than wool are, on the whole, making a larger interest on their capital than those who do not derive so much of their income from these other sources. This would indicate that our western sheep men are on the whole devoting rather too little attention to the production of mutton. This, of course, does not mean that the wool production must be forgotten, but both must go hand in hand and the question of which predominates will depend very largely upon the conditions under which the sheep are managed. The wool industry of the United States is on the whole one of very great importance. We produce in this country about 325 million pounds of wool, which is worth to the farmers something over 60 million dollars. This enormous amount of wool, however, does not meet the demands of the American people. While the United States produces about 325 million pounds of wool annually our mills consume approximately 500 million pounds. This extra amount must be imported from some foreign country. Australia is the greatest wool-producing country in the world, producing about three times as much as the United States. South America also produces about twice as much as the United States. The larger portion of this is produced in the one country of Argentine.

MARKET GRADES OF WOOL.

In order to obtain an adequate conception of the marketing of wool, and in order to be able to put an accurate interpretation upon market conditions, it is necessary to study the different grades and classes of wool. The money value of a pound of wool depends upon the following factors:
Length and strength of the fiber. 
Fineness of fiber. 
Shrinkage or condition. 
Color or character. 

Length and Strength of Fiber. The length and the strength of the fiber are associated together for two reasons: First, the kind of yarn which demands a long fiber also demands one of considerable strength; second, fiber lacking in strength will break in the process of combing, and the broken fibers must therefore class with the shorter wools. On the basis of length and strength, all wools are divided into two general classes known as COMBING and CLOTHING WOOL. In the manufacture of yarns we have two very distinct processes, resulting in two distinct kinds of yarns. First, CARDED WOOLEN YARNS, and second, WORSTED YARNS. In the process of making worsted yarns the wool is combed and drawn out in such a way as to make the fibers lie as nearly parallel as possible; while in the manufacture of carded woolen yarns the process of combing is omitted. In fact, exactly the opposite effect is desired, and the wool is so treated that the fibers are intermingled and interlaced as much as possible. The resulting yarns are, of course, quite different. The worsted yarns are hard, firm, and strong, while the woolen are softer, more loose, and not as strong. The worsted yarns are adapted to make smooth-faced, light fabrics, while the woolen are better adapted to the soft, heavy-fulled goods. The manufacturer of the worsted yarns, therefore, requires a longer and stronger fiber than is necessary in the manufacture of the carded or woolen yarns. In the early days of the woolen business only the longest and strongest fibers could be combed and therefore the only wools known on the market as combing wools were those of a very long, strong nature such as would be obtained from purebred or high-grade Cotswold or Lincoln sheep. The shorter wools such as those coming from the Shropshire or Merino breeds were in those days not considered long enough to comb. Recent improvements, however, in the process of manufacture have made it possible to comb much shorter wool than was formerly the case. There is no hard and fast dividing line between the combing and clothing wools, but generally speaking, the finest grades of wool should be at least two inches long in order to be classed as combing. Fine wool shorter than this can not be combed and must therefore be manufactured by the carded process. Such wools are known to the wool trade as clothing wool. With the coarser wools, a greater length is required. With the very coarse wool, such as would be obtained from pure-bred Cotswolds or Lincoln sheep, only those longer than four and one-half inches would be considered as combing wools. At the present time the wool from Cotswolds and Lincolns, as well as from most Merinos, would class as combing wool. The better grades of fleeces from the Down or mutton breeds would also come in this class, although the proportion of clothing wool from these breeds is decidedly higher than with either the coarse wools or the fine wools. We may say, therefore, that the term "clothing" refers to wool which is somewhat shorter than usual. The term "staple" is used in market circles interchangeably with the term "combing."
Grading as to Fineness. With regard to fineness of fiber, wools are most commonly divided into the following classes or grades:

- Fine and Fine Medium.
- \( \frac{1}{2} \) Blood
- \( \frac{2}{3} \) Blood
- \( \frac{3}{4} \) Blood
- Braid.

**Fine and Fine Medium** wools are very fine wools such as would be obtained from good pure-bred Merinos. Sheep to produce wool of this class must be of good Merino breeding.

**\( \frac{1}{2} \) Blood** wools are such as would be represented by the coarsest of the pure Merino wools. Seldom are the wools of the pure mutton breeds fine enough to come in this class. The sheep producing such wools are usually of Merino stock but with quite an outcross of native or mutton blood.

**\( \frac{2}{3} \) Blood** wools are such as would be represented by good Shropshire wool of the finer sorts. The sheep producing such wools are commonly grade blackfaces on a Merino foundation.

**\( \frac{3}{4} \) Blood** wools are intermediate in fineness between the Shropshire and the Cotswold or Lincoln. The coarsest grade of pure Shropshire wool might come in this class. It is ordinarily obtained from sheep having a mixture of Cotswold or Lincoln with some of the finer-wooled breeds. It will not take much Merino, however, to make it grade finer than a \( \frac{1}{2} \) blood.

**Braid** wools are the long coarse wools such as would be obtained from pure-bred or high-grade Cotswolds or Lincoln. They carry very little of any other blood.

These terms originated when about the only sheep in common use were scrubs or natives and Merinos. The terms \( \frac{1}{2} \) Blood, etc., were used to designate the wools obtained from sheep having that proportion of Merino blood. Custom has gradually caused these terms to be used for certain definite grades of wool regardless of the breeding. There are, of course, other terms used, especially to designate sub-classes.

**Prices.** In price the scoured wools of ordinary length rank in the order named, that is, the finer the wool the higher the price, other things being equal.

**Territory Wools** are the wools from the range states, so called because these states were territories at the time the term came into use. These wools all contain a large proportion of Merino blood and have a good deal of dirt and grease.

**Shrinkage or Condition.** When the wool comes from the sheep's back it contains a large proportion of oil or grease together with a considerable portion of dirt, sand, and other foreign matter. All of this stuff has to be removed in the scouring process and is a complete loss. The actual percentage of shrinkage varies with the weather, the soil, the method of handling, and with the breeding. Generally speaking, the fine wool ordinarily shrinks between 60 and 70 per cent, while the shrinkage on braid wool runs from 40 to 50 per cent. Necessarily this shrinkage must be a tremendous factor in determining the value.
of grease wools. Especially is this true when wools of the same fineness and from the same ranch will vary several per cent from year to year. The influence of small differences in shrinkage is shown by the following Table:

<table>
<thead>
<tr>
<th>Shrinkage</th>
<th>65%</th>
<th>66%</th>
<th>67%</th>
<th>68%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grease value when clean value is 47c per pound</td>
<td>16.45c</td>
<td>15.98c</td>
<td>15.51c</td>
<td>15.04c</td>
</tr>
<tr>
<td>Grease value when clean value is 60c per pound</td>
<td>21.00c</td>
<td>15.98c</td>
<td>19.80c</td>
<td>19.20c</td>
</tr>
<tr>
<td>Variation due to shrinkage at 47c</td>
<td>.47c</td>
<td>1.41c per lb.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variation due to shrinkage at 60c</td>
<td>.60c</td>
<td>1.80c per lb.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The buyer buys grease wools solely for the scoured wool they may contain. The grease and dirt are worth nothing to him.

**Color and Character.** While the color of the wool in the grease may have no connection with the color of the scoured wool, yet it is one of the earmarks by which the quality of the wool is judged. The first impression that reaches the mind regarding a lot of wool is through the eye and the color will convey a distinct impression, favorable or otherwise. It will therefore be apparent why you should tie your fleeces flesh side out.

Great importance is attached to wool which will wash or scour white, because of its general usefulness, being applicable for both white goods and pale shades of dyes. Wools that are very heavy in yolk and have a yellowish cast are not deemed suitable for pure white requirements. As wools age, the less likely they are to scour white. **Wools packed damp turn yellow quickly** and in many cases there is pronounced damage to the fiber. Wool containing alkali soil usually scours fairly white but red soil is looked upon unfavorably. Dry, harsh, wool, lacking in grease, may scour very white but for the lack of blood its rating may be impaired.

The character of wool is the strongly marked distinctive qualities which are judged according to well-accepted standards expected in wools of different quality. It is not sufficient to describe a lot of wool as "Fine and Fine Medium Combing, Shrinkage 66%" to convey to the mind of an expert just what the wool may be, as the combination of valuable qualities which go to make up character for wool of this grade may be more or less missing.

Owing to careless breeding, wools frequently lack brightness and are very irregular in fiber and staple. Marked differences are also noticeable in staples from various portions of the fleece. Many such wools are characterized by kemp, which affects both the spinning and dyeing of the material.

Wool that has "nature," combined with a firm elastic feel, is surely capable of good results in the process of manufacturing, while dry, harsh, brittle wool signifies unevenness of fibers and is subject to wastefulness by the breaking of its tissues. Mushy wool lacks character, having a soft, lifeless feel with no recoil to the touch.

Bankers will tell you that the best way to detect counterfeit money is to know the genuine. The same principle may be applied in judging
wool. If the grower knows good wool he can quickly determine whether his clip is up to standard.

**MISCELLANEOUS ITEMS.**

**Packing Wool.** To bring a good price wool must be packed in clean bags and tied with paper twine. Sisal or other common jute twines are very detrimental, as particles of fiber come off in the wool, and since sisal or jute will not take wool dyes, these particles must be picked out by hand. Even then, the danger of leaving some particles is so great that such wool can not be used for the finest grades of fabrics. Paper twine, on the other hand, sheds very few particles in the wool, and such particles are readily dissolved out in the scouring process. Burlap bags also shed some particles into the wool. Australian growers singe the interior of the bags or line them with paper.

Another serious matter to the buyer is the practice of packing all kinds of wool in one sack. Thousands of sacks of wool are marketed containing some fine medium wool, some 1/4 blood, some braid, some tags, and some black wool. The buyer who wants one kind does not want the other kinds, and when forced to buy them pays a proportionately lower price. Wool of different kinds should be put into different bags and sold accordingly. Especially should the black wool be packed separately. Black wool is worth as much as white and for some purposes more, but a few fleeces of black in a bag will lower the value of the whole, since such wool can not be used for making pure white and cream cloth on account of the danger of black fibers. Manufacturers of fine white and cream serges use Australian wool so they may be sure of their product.

**Paint.** Common paint brands injure the wool very much, as paint will not come off in the scouring process. The loss from paint is shown by the following test made by a prominent manufacturer:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost of 1000 pounds virgin wool, 995 pounds wool fiber and 5 pounds paint at 22¢</td>
<td>$220.00</td>
</tr>
<tr>
<td>2 hours labor clipping</td>
<td>.55</td>
</tr>
<tr>
<td>*Loss on clipped wool</td>
<td>1.10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$221.65</strong></td>
</tr>
</tbody>
</table>

Yield 995 lbs., cost $221.65 or 22.3¢ a pound.

*The clipping of the paint shortens the staple so that it is only as long as clothing wool. The difference between combing and clothing wool is at least 10%, and as there would be at least 50 pounds of wool thus clipped, the loss would be 10% of $11.00 or $1.10.

The above shows that there is a loss of about 3¢ a pound on account of paint. This would mean about 2.4¢ a head. Aside from this loss, the impossibility of getting off all of the paint in the wool makes it necessary to use unpainted wools for the finer products. On the ranges sheep must be branded and there is no brand now known that will stay a whole year and yet scour out. Kemp's Australian Branding Fluid will, however, remain for one-half year and will scour. The only way to remedy the paint brands, therefore, is to use the Australian brand and brand twice a year.
Feeding for Wool Production. Feeding has very little to do with wool production providing the sheep always get plenty to keep them in good thrifty condition. Periods of semi-starvation always produce weak places in the wool and so lower the value as noted under clothing wool. Tests show that heavy feeding tends to produce a heavier fleece, but that the increase is in the grease rather than in the scoured wool. The effect of feeding upon the fineness of the fleece is apparently of little or no importance. These points seem to be a matter of breeding rather than of feed.

THE HANDLING OF SHEEP.

It is surprising to notice the contrast in the art of handling sheep in our country and in England. In America many flock owners treat their sheep merely as farm scavengers. In England, the sheep are treated in an entirely different manner. The people realize the value of sheep on their farms and treat them as they should be treated. In this country we often hear the farmers say that they never had much luck with sheep. The element of luck does not, to any great extent, enter into the care and raising of sheep. It is not poor luck, but ignorance of management that has discouraged many of our farmers from raising sheep. A sheep is a gentle and timid animal and should be treated accordingly. It is awful to witness the inhuman treatment given sheep on many of our farms. To most farm hands the wool seems to be the natural handle of the animal. By it the sheep is caught, lifted, dragged from one place to another. Examination of a newly killed sheep treated in this manner shows an inflamed and bruised area at every point where the wool was pulled. Such treatment inflicted on sheep is not only unnecessary, but will cause a lack of gain and in many cases an actual loss.

Catching a Sheep. Never try to catch any member of the flock in the open field. Instead, drive the flock into a corral or enclosure where the sheep desired may be caught without the unnecessary chasing and frightening of the entire flock. The proper way to catch a sheep is by the neck, the flank, or the hind leg. In catching by the hind leg, never grab lower than the hock, as this will allow considerable struggling. Sheep caught in any of these manners are not frightened or bruised in any way.

Leading Sheep. After the sheep has been caught, never try to lead it by taking hold of its neck and dragging it along. Instead, get on the left side, place the left hand under the lower jaw and the right hand on the end of the dock or tail head. By gently pressing on the dock one can easily get the animal to move to any place desired. In this manner the left hand is used in guiding the sheep and the right hand is used in producing the motion.

Lifting and Carrying Small Sheep. Occasions often present themselves when it becomes necessary to lift and even carry small sheep for a short distance. This can be most easily performed in the following manner: Standing to the rear of the sheep and a little to the right side, place the right hand just back of the right front leg and underneath the brisket. Gently raise the front end of the sheep off of the ground and with the left hand grasp the hind leg at the hock and
Fig 14. A, B, and C, steps in upsetting a sheep. D and E, steps in lifting a sheep. F, method of leading a sheep.
lift the sheep right up. By this method struggling is prevented and no harm whatever is done to the sheep.

Setting a Heavy Sheep On Its Rump. With a light sheep or lamb it is a relatively easy task to set it on its rump by simply lifting it up and setting it down. With heavier sheep, however, especially rams, this would be impossible. Perhaps the best way to upset a heavy sheep is to stand on the left side. First place the left arm around the front of the sheep and with the right arm reach across under the animal and grasp the right rear leg at the hock. Then by gently pushing the sheep with your chest and at the same time drawing its right hind leg, the animal is easily rolled up on its rump. Never have a sheep set squarely on its rump, as all weight then comes on the dock or tail head and will cause a great deal of uneasiness to the sheep. Rather let it tip to one side or the other, supporting it somewhat with your knee. To get the sheep back on its feet, merely push it forward and let it go.

Hauling Sheep. At all times sheep should travel on their feet even when being hauled. A wagon to haul sheep should have slatted sides sufficiently high to prevent their jumping out, or boards may be laid across the top, forming a cover to the wagon. A wagon rack that is about 14 feet long and as wide as the wagon box, sides and ends of which are slatted, and about 3 feet high, makes a very good wagon for hauling sheep. In loading the sheep, it is not necessary to lift them by the wool. Loading should be done by two persons, one on each side of the animal. The left hand of one loader is grasped by the right hand of the other underneath the chest of the sheep. Then the other two hands are simply grasped beneath the flanks. In this way the sheep may be loaded without injury.

GLOSSARY OF SHEEP TERMS.
Binders—Cross fibers that hold the locks of a fleece together.
Brightness—A term referring altogether to the color of wool. It is quite distinct from the term lustre.
Britch—That part of the fleece that covers the rear legs.
Broken Mouth—A mouth in which one or more of the permanent incisor teeth are badly broken or missing.
Buck—A male sheep. This term is used largely in the range district. The term ram is preferable.
Cod—The scrotum or sack covering the testicles.
Crimp—The spiral or waves found in each fiber of wool.
Dock—The portion of the tail left after docking.
Dressing percentage—The weight of the dressed carcass of mutton or lamb expressed as a percentage of the live weight.
Ewe—Female sheep.
Feeders—Lambs wethers or ewes not fat enough to slaughter but ready to be placed in the feed lot. Lambs are the best feeders as they make the most economical gains.
Four-Year-Old—A sheep past 48 months and having 8 permanent incisor teeth.
Full Mouth—A mouth which contains 8 sound permanent incisors.
Gummy—An old ewe having a badly broken mouth.
Hogg—A yearling sheep. Hogg wool is the first fleece from a sheep.
Kemp—Dead fiber found in a fleece.
Lamb—A sheep under 12 months of age and having no permanent teeth.
Lustre—A term referring to the glistening appearance of the fiber or wool when held to the light.
Purse—The scrotum after the testicles have been removed.
Ram—A male sheep.
Scrotum—A sack containing the testicles of a male animal.
Scurs—A horny growth taking the place of horns.
Two-Year-Old—A sheep between the ages of 24 months and 36 months, and having 4 permanent incisor teeth.
Three-Year-Old—A sheep between the ages of 36 months and 48 months, and having 6 permanent incisor teeth.
Wether—A castrated male sheep.
Yolk—The natural oil or grease found in a fleece.
Year—To bring forth a lamb; to lamb.
Yearling—A sheep between the ages of 12 months and 24 months, and having 2 permanent incisor teeth.