SHEEP HUSBANDRY IN CANADA

Published by
authority of the
Hon. W. R. MOTHERWELL
Minister of Agriculture
Ottawa, Canada

SHEEP HUSBANDRY IN CANADA

Fourth Edition

By

J. B. SPENCER, B.S.A.

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

BULLETIN No. 41—NEW SERIES
REVISED EDITION OF BULLETIN NO. 12 OF THE LIVE STOCK BRANCH

Published by direction of the Hon. W. R. Motherwell,
Minister of Agriculture, Ottawa,
June, 1924

LIVE STOCK BRANCH

Live Stock Commissioner	-	H. S. Arkell
Chief, Horse Division	-	G. M. MacRae
Chief, Cattle Division	-	R. S. Hamer
Chief, Sheep & Swine Division	-	A. A. MacMillan
Chief, Poultry Division	-	W. A. Brown
Chief, Stock Yards Service	-	J. M. McCallum
Chief, Markets Intelligence Service	-	P. E. Light

Fig. 1—Resting at Midday

SHEEP HUSBANDRY IN CANADA

HISTORICAL REVIEW

The sheep industry of Canada dates back almost to the beginning of her agriculture, for the first settlers, as soon as they were able to do so, established little flocks of sheep to supply both food and clothing for their families. The first sheep to come to Canada, according to record, were brought from France in the middle of the seventeenth century. Others followed from time to time during the French regime, but for nearly one hundred years afterwards no other sheep were brought in. These French sheep were small, and are said to have much resembled the Cheviot in size and conformation, particularly in the shape of the head, while the quality and weight of the fleece was much the same.

Toward the end of the eighteenth century, colonies of United Empire Loyalists that settled in the Maritime Provinces, Quebec and Ontario, brought with them from New York, Pennsylvania and other Eastern States, such sheep as were common in the districts from which they came. These, as a rule, were grades of the leading English breeds in those days, including Cotswold, Leicester, Hampshire, and Southdown.

As early as 1830, British immigrants commenced to bring small stocks of sheep, and by these the quality of the established Canadian flocks was improved. About the year 1842, a small number of Leicesters and Cotswolds were imported from England, and a few years later, Southdowns began to appear. From that time onward, shipments were landed almost every year. A report of the first provincial exhibition held in Toronto in 1846 states that the exhibits of Leicesters and Southdowns were of excellent quality and well adapted to the country. Two years later, in addition to the two breeds already named, Merinos were shown at the provincial exhibition. The numbers increased year by year, until the exhibit at London in 1854 amounted to 400 head, divided as follows: Leicesters, 200; Southdowns, 44; Cotswolds, 30; the last named being newly imported by George Miller, of Markham. In addition to a small exhibit of Cheviots, made that year by George Ruddick, of Northumberland county, the remainder consisted of grades. The following year the show of Leicesters was not quite so large, but the entries of Southdowns, Cotswolds and Cheviots were more numerous than heretofore. The prize winners were as follows:

Leicesters—Chris. Walker, London; Wm. Miller, Pickering; Geo. Miller, Markham; and Jas. Dickson, Clark.

Southdowns—John Spencer, Whitby; R. W. Gordon, Paris; R. W. Stanley, Haldimand; Richard Coats, Oakville, and A. Burroughs, Brantford.

Cotswolds—John Snell, Edmonton; Wm. Smith, Clark; Wm. Miller, Pickering; F. W. Stone, Guelph, and Geo. Miller, Markham.

Cheviots—Wm. Ruddick, Markham.

A number of these men occasionally showed at the New York State Fair and brought away much of the prize money competed for. The entries of pure-breds kept up well. In 1858, the show of Leicesters numbered 188; Cotswolds, 39; Cheviots, 15; Southdowns, 49; Longwools, not pure-bred, 68; Merinos, 29 and fat sheep, 19. The Longwools, including grade Cotswolds, Leicesters and Lincolns, were magnificent sheep, equal in many respects to the pure bred classes. The Merinos and Cheviots did not gain ground, but all of the other breeds improved, multiplied and increased in popularity until the sheep industry of the country in the early 'sixties had become a very popular and profitable branch of farming.

To encourage importation, the Board of Agriculture of Ontario in the early 'fifties resolved to double, and a few years later to triple, the amount of any first prize won at the provincial exhibition by an animal imported during the year. An increas-

ing number of enterprising men, year after year, took advantage of the opportunity to introduce improved blood into their flocks, which by this time had grown numerous and many of them fairly large. County agricultural societies also took a keen interest in stock improvement by purchasing and distributing improved males among their members. For example, in 1854, Grey County Society bought ten rams and sold them for $285. Three years later the Kent County Society paid $320 for 21 rams and sold them for $175. Much good resulted from this public-spirited effort.

As early as 1833, sheep were introduced into Manitoba, when the Hudson's Bay Company was commencing to develop the country. Governor Simpson of that Company, with the object of benefitting the little band of settlers that comprised the Selkirk colony organized a joint stock company and sent agents south into the United States to buy sheep. These agents went first to Missouri and then to Kentucky, where they purchased 1,745 sheep at about $1.50 each, and started to drive them back to the colony on the banks of the Red river. Through bad management most of the sheep died on the journey, only 251 arriving at their destination. Subsequently, the shareholders in the company quarrelled and the Governor took over what was left of the flock. These were sold by auction, and brought as high as $2 each, a high price in those days. Somewhere about 1840, the Hudson's Bay Company is said to have brought from England some pure-bred rams for the improvement of the sheep of the colony.

A few years later, sheep arrived in the Pacific province under somewhat similar circumstances. The Hudson's Bay Company, and later the Puget Sound Agricultural Company, the latter composed of Hudson's Bay employees, established farms at Fort Nisqually, on the plains of what is now Washington state, a few miles distant from the city of Tacoma. At that time this territory was under the control of the Hudson's Bay Company, the international boundary between the United States and the British possessions on that part of the continent not having been decided. Sheep driven from California were purchased by the agents of the companies, until in the early 'forties the flocks numbered some thousands. The quality of these sheep was improved by the importation from time to time of well-bred rams from Great Britain, *via* Cape Horn on sailing ships, which brought for the companies their annual mail and fresh stocks of goods. When the boundary line was finally agreed on, these flocks were disposed of, a large number of sheep going to Oregon, where they played an important part in founding the great sheep industry of that state, and from there were scattered over the neighbouring states. It will thus be seen that the early British settlers were among the first promoters of improved sheep husbandry in the Pacific northwest.

On the establishment, in 1843, of a Hudson's Bay post on the site of the present city of Victoria, British Columbia, at the southern end of Vancouver Island, farms were located by the two above-named companies and sheep brought from Fort Nisqually to stock them. These sheep were principally of the Merino, Southdown and Leicester blood, and were the foundation of the sheep-breeding industry in that province. They did well, and, in 1849, numbered several hundred head, in spite of the depredations of panthers, wolves and bears, and occasionally of vagrant dogs. The sheep were herded by armed Indian shepherds in the day time and corralled at night. Indians from early times showed their appreciation of a change of diet from fish and venison by occasionally raiding flocks. This love of mutton made a little British Columbia history in the early 'fifties, when a warlike band of Indians swooped down from their village a short distance up the coast to Victoria, and raided a flock, murdered the shepherd, and carried off a number of sheep. Their village was visited by a British gunboat from Victoria some time afterwards, and the murderers were captured and hanged on a tree nearby. This first experience of British justice made a deep impression on the natives, which was shown by their carving and painting a large figure of a British marine standing at attention. This adorned a prominent spot in the village for years afterwards.

The Hudson's Bay Company continued to assist the farmers in this province by establishing small private flocks near Victoria. These were owned and kept by employees of the Company. This Company, as well as the Puget Sound companies and private individuals imported improved rams from Great Britain for the use of the Pacific coast settlers.

As early as 1671, Acadia (Nova Scotia) , is credited with 407 head of sheep. Eight years later, New France (Quebec) had 719 head. One hundred years later, Quebec flocks contained 84,696 head, which after another sixty years had increased to more than 600,000 head. The adjoining province of Upper Canada (Ontario) at that time supported about 500,000 sheep. In 1851 Lower Canada (Quebec), is credited with about 650,000 head and Nova Scotia with 282,000. Ten years later Upper Canada had 1,170,000 head and Lower Canada 683,000. The sheep in those days corresponded closely with the number of cattle kept, which was considerably more than either the hogs or the horses maintained on the farms.

While sheep raising is carried on chiefly with small flocks along with other stock in "mixed" farming, it is also conducted under the ranching system in Southern Alberta, where it has reached its greatest development, as well as in the provinces of Saskatchewan and British Columbia. Ranch flocks vary in size from one thousand up to twenty thousand head in a few cases. The foundation of the stock making up the ranching bands came largely from the adjoining states of the American Union, and was chiefly of Merino breeding. The original stock produced small carcasses and heavy fleeces of fine wool. In recent years, Down and Longwoolled sires have been introduced, increasing the weight of carcasses and lengthening the wool staple. The bands are grazed under the care of herders the year round. In winter the sheep are expected to "rustle a living," which they can usually secure with a little assistance on the part of the shepherd, who, when necessary, by the use of a snow plough, breaks the crust, uncovering the grass, and at times provides an allowance of fodder put up the previous season. The produce of these bands, finished on screenings and other suitable foods, develop a very high quality of fleece and carcass.

The following table gives the number of sheep kept on farms, by decades, from 1871 onward:

1871	3,155,509
1881	3,048,678
1891	2,563,781
1901	2,510,239
1911	2,174,300
1921	3,675,860
1923	2,753,860

The distribution by provinces in 1923 was as follows:

Prince Edward Island	83,933
Nova Scotia	258,537
New Brunswick	157,808
Quebec	822,997
Ontario	907,673
Manitoba	93,162
Saskatchewan	137,240
Alberta	239,174
British Columbia	53,336

With the exception of the Rambouillet, the sheep that have been imported into Canada are of the British breeds, and comprise Shropshire, Lincoln, Cotswold, Oxford, Leicester, Dorset Horn, Suffolk, Hampshire, Southdown, Cheviot, Romney Marsh, and Corriedale. For all these breeds pedigree registration has been established under the National Live Stock Record system.

Government Assistance to the Industry.

Previous to 1910, government aid to the sheep industry took the form of financial assistance to sheep sales in certain of the provinces. This resulted in the distribution of large numbers of breeding sheep, particularly in the Maritime Provinces and in Quebec. At that time, considerable general lecture work was being carried on, a sheep bulletin had been issued, and special work was being undertaken through the medium of the winter fairs, in the form of lectures and the supplying of judges. The registration of sheep of the various breeds had also been well organized.

About this time, Mr. Wm. A. Dryden, of Brooklin, Ont., and Mr. W. T. Ritch, were appointed a commission to enquire into the sheep industry. Their report was printed and widely distributed. Following the recommendations of the commission, a sheep division, with a chief at its head, was created in the Dominion Live Stock Branch. This move was made with the idea of developing a plan for the marketing of wool and for the improvement of sheep conditions generally.

In accordance with the policy of development laid down at that time, local wool growers' associations were formed and wool grading demonstrations given. Shortly afterwards, many of these associations were contributing wool in quantity for grading and co-operative sale. Coincident with this development, wool graders were added to the staff of the Sheep Division, and the Branch undertook the grading of all wools offered by co-operative associations. In addition, for several years, Sheep Division officers gave advice to and were associated with the local directorates of the wool growers' associations in connection with the sale of the wool clip.

By 1918, knowledge of wool grading and its benefits had become general among sheep men, and the organization of wool growers' associations had developed to the point where sheep raisers in all the provinces were organized for the co-operative marketing of wool. A vast improvement had also been brought about in the preparation of Canadian wools for the market, and as a result, graded wools were selling at good market prices both in Canada and abroad.

It was felt that the time had now arrived to provide a permanent marketing agency for Canadian graded wools. Representatives of the various associations were called in conference, and the Canadian Co-operative Wool Growers, Limited, was organized in 1918 under the Dominion Companies Act. With this organization all the local wool growers' associations are affiliated. The Board of Directors and the officers are appointed by the wool producers. The members of the administrative staff are engaged from year to year, and have charge of the sale of wool for each of the associations. The head office is in Toronto, Ont., and branch offices are located at Regina, Sask., and Lennoxville, Que. In addition to selling wool, the organization handles shepherds' supplies and woollen goods. The Dominion Live Stock Branch still supplies graders for grading all co-operative consignments of wool.

After the formation of the Canadian Co-operative Wool Growers, Limited, the Sheep Division was reorganized to take care of the sheep industry as a whole. Additional sheep promoters were appointed with headquarters in the various provinces, assistance was continued in the preparation of wool for market, and in addition, a number of policies were instituted to assist in improving the quality of Canadian sheep and in marketing lambs of superior type. The Ram Loan Policy, which has been in effect since 1913, has done much to popularise the use of pure bred rams on grade flocks. The Ram Premium Policy, introduced in 1919, provides for the payment of two annual premiums of five dollars each to farmers buying a pure-bred ram for the first time. This policy has facilitated the organization of ram clubs in many of the older established districts. The establishment of these clubs made it possible to promote community breeding and to inaugurate a definite sheep improvement scheme, which included the dipping, docking, and castration of lambs.

As breed improvement work was extended, it was found that the local marketing agencies did not, in most cases, provide for the sale of lambs on a quality basis. This

condition was found to be decidedly pronounced in the Maritime Provinces, where the lack of stock yard facilities and distance from market made it more difficult for the farmers to acquaint themselves with market prices. A number of co-operative shipments were made, and these proved so successful that in a short time many co-operative shipping centres were established in each of the three Maritime Provinces. In other provinces, in isolated districts, the same conditions prevailed, although, generally speaking somewhat better average market prices were realized, and accordingly, it was felt that some project was necessary to concentrate attention more definitely on breeding and marketing. The first Sheep Fair and Market Lamb sale was held in Quebec in 1921. This sale proved to be so effective as a means for demonstrating the increased market value of lambs from pure bred sires and the premium obtainable through docking and castrating, that, in 1922, a Sheep Fair and Lamb Sales Policy was inaugurated and applied in the provinces of New Brunswick, Nova Scotia, Quebec, Ontario, and Manitoba. The minimum exhibit of lambs required under this policy is three hundred head, and prizes are awarded for pens of five head, for pens of ten head, and for a pure-bred ram and progeny. The lambs after being judged, are graded, and either offered for sale locally, or shipped to the best available market. Probably no one policy has done more to educate the farmers to the commercial importance of the finer points of sheep husbandry and to establish confidence in the industry than these fairs and sales. which are becoming an annual event in certain districts.

Throughout the development of sheep promotion work, there has been very close co-operation with the provincial departments of agriculture, and especially with the agricultural representatives and agronomists of those departments. Field men have made it possible to centralize the work locally in a very definite manner, thus adding stability and continuity to the various projects.

THE MUTTON SHEEP

The production of mutton has become very largely a question of furnishing lambs to the market. As in beef and pork, the demands of the market call for young meat and comparatively light weights of carcass. The premium paid for baby beef and bacon hogs applies with even greater force to sheep. Thick, fleshy, but rather light joints are what the cook calls for whether for the home table or the restaurant. The tastes of the consumer have been cultivated to discriminate in favour of the tasty, tender lamb until we find that from 70 to 80 per cent of the sheep that reach the market are less than one year old. The age of heavy mutton seems to have passed—a condition most favourable to the sheep raiser, who is thus enabled to reap quick returns from his flock. In the very nature of things there will always be mature sheep sold as mutton as the breeding stock must, sooner or later, reach the block. The increasing demand for lamb mutton augurs well for the future of the industry, provided care is taken to keep up and improve the grade of the product. What is needed is careful attention to not only the production of the rapidly growing lamb, but that it possesses the qualities called for by the high-class trade. A prime lamb is in demand and will always command a high price, while the skinny, lank, and bare-backed sheep is not wanted at all. The market wants flesh in any case, and when it comes from the back, the loin or the leg so much the more is it prized.

The raising of lambs for the market requires first of all a strong uniform flock of ewes that are active foragers, uniform and regular breeders, and copious milkers. It is also important to pay careful attention to the shearing qualities of any flock of sheep.

As with other classes of stock, the matrons of the flock must be vigorous in order to produce lambs that will take hold of life courageously. In addition a ewe requires a strong maternal nature which is shown in prompt and ready care for the newly born offspring and a copious supply of milk. Such ewes are deep and wide in the chest, fairly compact but with sufficient length to give considerable size to their middles. Their heads should be pronounced in breadth between the ears, they should have large, mild, wide open eyes and well expanded nostrils. They should be free from coarseness, as also over refinement which suggests delicacy of constitution. These are the characteristics which the breeder needs to look for in order to get thrifty, well-doing offspring, but the other side of the question—that of the market —has also to receive attention.

Viewed from Market Standpoint.

To form a basis for estimating the good and bad qualities of sheep, it is best to consider the carcass and that from the point of view of the butcher. The different parts of the lamb show a wide variation from the butcher's standpoint. The most valuable meat is found over the back, loin and hind-quarters. The butcher, therefore, calls for a broad back, a broad full loin and a heavily fleshed leg of mutton. The shoulder is not so valuable as the cuts farther back. The neck is a cheap part and is valuable according to thickness, but since it sells for little it is not important to breed for neck development. On the other hand, a thin neck is to be avoided, because such indicates weakness of constitution, and a thin neck usually goes with a slenderness of body. The neck, therefore, should be short and thick, which condition is likely to characterize the entire carcass. The carcass is usually divided by the butcher between the second and third ribs. The front part is worth about two cents per pound less than the hind part. It, therefore follows that from the market standpoint the development of the back, loin and hind-quarter must be kept in mind. In all the

parts smoothness of conformation is important. Roughness or angularity invariably go with bareness of back and an excess of bone in the carcass. A rough sheep is usually very open at the top of the shoulder, showing a pronounced depression between the shoulder blades. This part for six or seven inches should be flat and well covered with flesh in a fatted sheep. The ribs should show good spring and be well covered with firm flesh. The back bone should not stand prominent at any point in a sheep even in only moderate flesh. A groove over the spinal column frequently seen in well fleshed sheep is not objectionable although flatness and smoothness are rather to be preferred. While a full, fleshy loin is most desirable a high arching loin is not the formation to be looked for and perpetuated. The level smoothness recommended for the shoulder and back over the ribs, should characterize the loin. A high loin is inclined to be bare rather than fleshy, or the loin may appear high in comparison with a low, sagging back which is always to be condemned as bad formation. The loin should have width and thickness in order to yield a good quantity of flesh. Among the common flocks of the country drooping rumps are frequently seen. This is most undesirable whether the falling away is towards the tail-head or down the thigh. The hind-quarter should continue straight and full both on the top and side lines. From the hip to the hock a sheep in good flesh should be especially strong. Not only should the 'leg of mutton' be plump and full with muscle on the outside, but between the legs, in the twist, the flesh should fill well down to the hock, compelling the hind legs to stand well apart. When grasping the leg on the inside a decided plumpness should be found in a mutton sheep.

The Feeder's Side.

From the market standpoint the chest, breast and underline require little consideration, but from the side of the feeder or breeder these parts are of great importance. A sheep to be profitable to the feeder must have vigorous constitution and be able to consume a large amount of food and transform it into valuable meat at the lowest possible cost. These characteristics are invariably associated with a wide, deep chest, good depth of barrel, and well sprung ribs to give ample room for the lungs, heart and digestive organs. The wise feeder or breeder will also look for good size, because he wants an animal that will attain a good weight at an early age. A short, broad head, full, bright eyes, an open nostril, strong lips and a short, thick neck, deep body and short legs all go to indicate a vigorous, thrifty animal which will give a good return for food consumed and kill out a valuable carcass of mutton.

The breeder who wishes to establish a pure-bred flock, besides requiring all these marks of excellence which the butcher and feeder require, needs to pay much attention to the character of the fleece, the colour and covering of the head and legs, the colour of the skin, and correctness of breed type.

Scale of Points for Mutton Sheep.

A. General appearance, 24 points.

Estimated weight, lbs., according to age and breed.	
Score, according to age and breed	4 points.
Form—long, deep, broad, low set, and uniformly smooth; top line from neck to turn of rump, and underline from point of brisket to hind flank, straight and parallel	8 "
Quality—bone fine and clean-cut; hair on face, ears and legs soft; skin, fine and mellow; all fleshy parts well developed, showing even covering of firm flesh	8 "

Style—active, alert, vigorous but not restless, exhibiting aristocratic bearing .. .. 4 "

B. Head and neck, 9 points.

Strong without coarseness; nostrils large .. .. .. 1 point.
Eyes—large, prominent, clean and placid .. .. 1 "
Face—rather short than long; features clear-cut and attractive .. .. 1 "
Forehead—broad and prominent .. .. 1 "
Ears—fine in texture, medium size for the breed, carried with lively back and forth movement .. .. 1 "
Neck—short, thick, round with full neck vein, free from folds at throat, carrying the head well erect; stronger and more arched in rams than in ewes .. 4 "

C. Forequarters, 6 points.

Shoulders—large, plump and smooth; wide above, rounded out from above, forward and below to the centre, well filled before and behind, uniting with neck and back imperceptibly .. .. 4 "
Legs—arm broad and well muscled; leg straight, short, wide apart and yet well placed under the body, standing firmly on hoofs of good shape and quality 2 "

D. Body, 30 points.

Chest—deep and full, indicating abundance of heart and lung capacity; breast full; brisket prominent and broad; heartgirth large .. .. 9 "
Back—level, wide, well covered with firm flesh, with spinal column hidden and even depressed from the loin to the tail head .. .. 9 "
Ribs—well sprung from backbone, nicely arched and well covered with flesh .. .. 4 "
Loin—broad, full and thick .. .. 6 "
Flank—well developed in thickness and even with side and underline .. .. 2 "

E. Hindquarters, 16 points.

Hips—far apart, level, smooth, well covered with flesh 2 "
Rump—long, broad, carrying width and topline well back to tail, deeply and evenly fleshed .. .. .. 4 "
Thighs—broad, and well filled, carrying plumpness well down to underline of body .. .. 3 "
Twist—full and deep, nearly as low as flank .. .. .. 3 "
Legs—short, straight and strong, wide apart, yet well under the body, standing firmly on hoofs of good shape and quality; pasterns, strong and only slightly sloping .. .. 2 "
Skin—a rich pink in colour and possessed of mellow handling qualities. .. .. 2 "

F. Wool, 15 points.

Quantity—long for the breed, dense and even	6 "
Quality—fine for the breed, pure crimp regular and uniform	5 "
Condition—bright, sound, clean, soft and lustrous	4 "

POINTS OF THE SHEEP.

1. Muzzle.
2. Mouth.
3. Nostril.
4. Lips.
5. Nose.
6. Face.
7. Forehead.
8. Eye.
9. Ear.
10. Neck.
11. Neck vein or shoulder vein.
12. Top of shoulder.
13. Shoulder.
14. Arm.
15. Shank.
16. Brisket or breast.

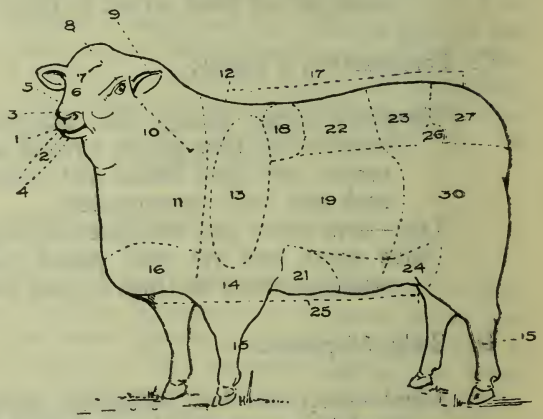


Fig. 2.—Points of the Sheep (side and front view).

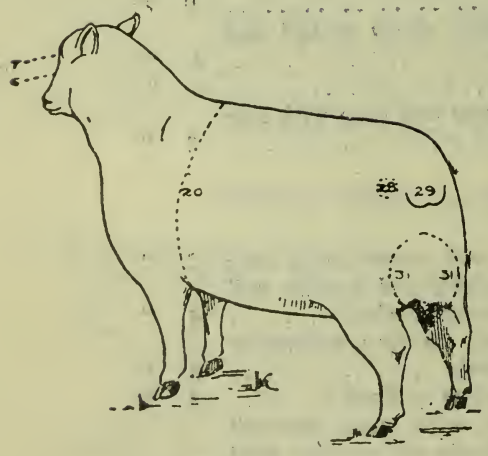


Fig. 3.—Points of the Sheep (rear view).

17. Top line.
18. Crops.
19. Ribs.
20. Girth, or heart girth.
21. Fore flank.
22. Back.
23. Loin.
24. Hind flank.
25. Underline.
26. Hip.
27. Rump.
28. Pin bones.
29. Dock or tail.
30. Thigh, or leg of muton.
31. Twist.

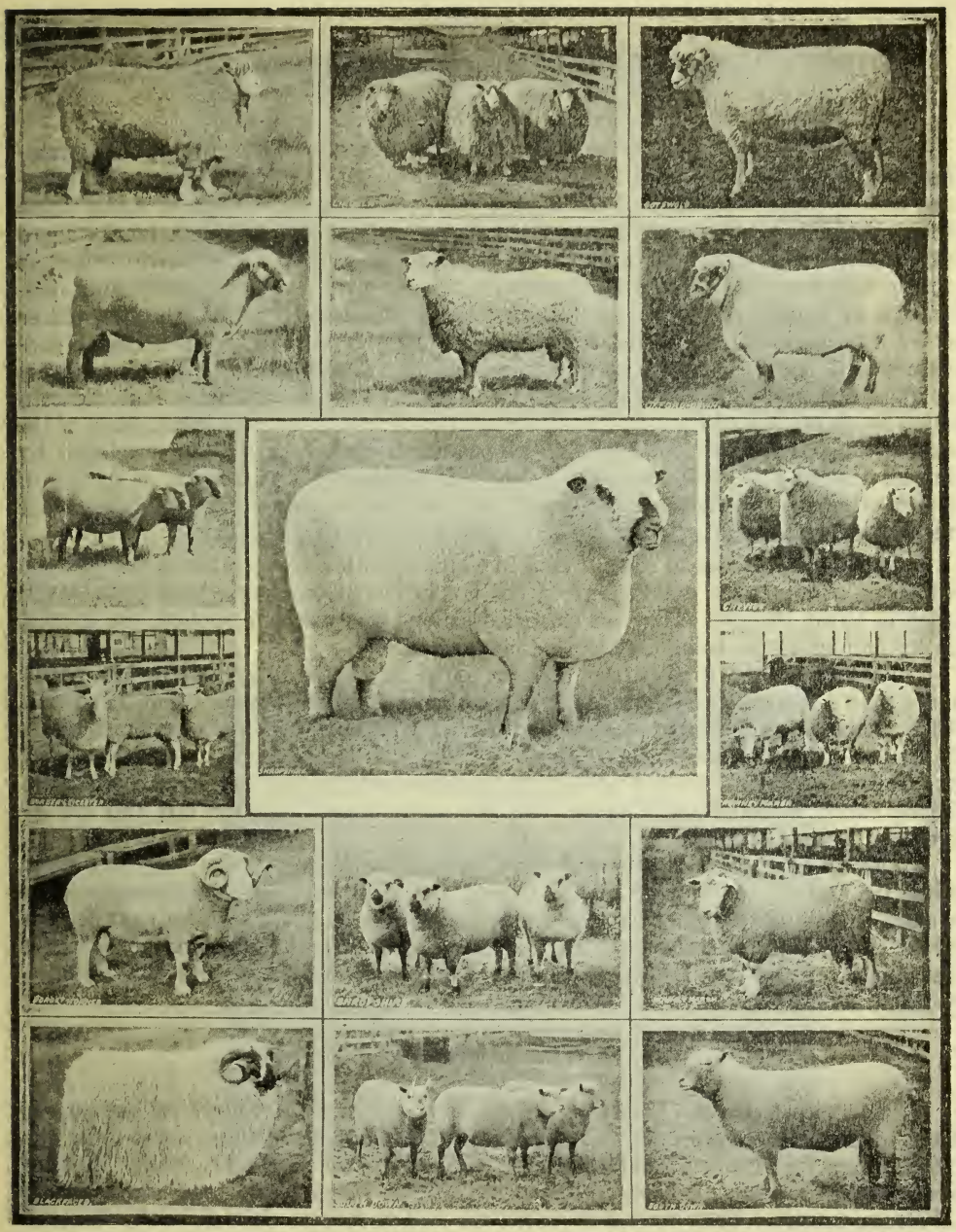


Fig. 4.—Representatives of British Breeds of Sheep.

LEADING BREEDS OF SHEEP

THEIR ORIGIN, DEVELOPMENT AND CHARACTERISTICS.

There are a great number of varieties of domestic sheep, all of which are doubtless descended from one wild form. Domestication of this class of animals commenced almost at the beginning of the human race, when the second son of Adam chose sheep herding as an employment. With the migration of the human family sheep were taken to different parts of the world and under the varying environment in which they were perpetuated they assumed characteristics and properties quite different from one another. With improvement in agricultural practice sheep as well as other farm animals were kept and developed along special lines. This going on simultaneously in different portions of Europe and Asia it was but natural that varieties of quite different characteristics would be evolved. The probability is that domesticated sheep originated through the domestication of several races in many parts of the world, the peculiarities and valuable properties of each having been developed by selection, until a more or less perfect type was obtained. The crossing of species of sheep originally distinct has no doubt still further increased the number of our recognized breeds.

The leading breeds of sheep found in Canada, with the exception of the Merino, which is kept to some extent only in the northwestern provinces, have been developed in Great Britain. They are classified as long and medium woolied, the Merino in its various forms being classed as fine woolled.

Throughout the British Isles there is found in a state of greater or less purity more than a score of breeds, the chief of which are as follows: Black-Face, Herdwick, Gray, Lonk, Devon, Longwool, Exmoor, Welsh, Cheviot, Suffolk, Leicester, Lincoln, Cotswold, Oxford, Shropshire, Hampshire, Southdown and Dorset. Of these only the last eight breeds named are at all common in Canada. A small number of Black-Faces, Suffolks and Cheviots are also to be found, and the last two are increasing in some sections.

The Lincoln, the Leicester and the Cotswold are known as the long-wool sorts, while the Oxford, the Shropshire, the Dorset, the Hampshire and the Southdown are classed as medium-woolled, the fleece shortening in length in the order named. The fleece of the Cheviot and also of the Suffolk is medium in length, but the former is the longer of the two. These two sorts are, therefore, placed with the medium-woolled varieties.

The Leicester.

The Leicester is the oldest of the long-woolled races of sheep. It appears to have inhabited Leicestershire, England, and the adjoining counties even prior to 1660, when the districts referred to were noted for the excellent quality of their sheep, which are said to have possessed large bone, rangy frames and heavy fleeces of strong texture. They were slow to mature and to fatten. It is generally believed by authorities that the sheep found in these counties, known as the Midlands, were used by Robert Bakewell, of Dishley, as the foundation of the New Leicester or Dishley breed.

Mr. Bakewell commenced the improvement of the sheep of his district in or about 1755. The merit of his work consisted in his realization of the fact that the properties of parents may be transmitted to their offspring until fixity of type is the

Fig. 5.—Leicester Ram.

Fig. 6.—Leicester Ewe.

result; also in his innate power of discerning by an animal's external form and 'quality' that it possessed the properties he desired to perpetuate. He was able to discriminate between size and quality and had always an eye for the latter when selecting breeding animals. In order to render permanent the desired qualities of the selected stock he resorted to in-and-in breeding to an almost incestuous degree. The qualities sought by Bakewell were greater symmetry of form, improved qualities of fattening, and an earlier maturity, a reduction of the proportion of bone and fat, and a greater development of the parts of the carcass of most value to the block. These characteristics were undoubtedly secured, but others of greater importance were to some extent overlooked; these were strength of constitution, prolificacy, as well as quantity and quality of fleece. The breeders of Leicesters in later years have overcome these defects.

It is recognized that no other breed possesses a greater expansion of heart girth than the Leicester. Nor is prolificacy lacking in the present day Leicester, as triplets are of frequent occurrence, and from 150 to 175 per cent of increase is not uncommon in well kept flocks. Whatever weakness marked the fleeces of Leicesters in Bakewell's time these have long since been overcome. As a rule good specimens are thoroughly covered in all parts except head and legs; length and density are also present in a high degree, while the wool of no other breed excels in lustre.

In order to extend the blood of the improved stock as rapidly as possible, Mr. Bakewell instituted a system of hiring rams of his flock for the breeding season to farmers in the district. During the first year or two, farmers were slow to take advantage of the use of improved sheep, and all Mr. Bakewell could get for the season's use of rams was some 17 shillings and 6 pence each, but the improvement effected by these crosses was so evident that in a few years the demand for the sheep became so keen that the price rose to one hundred guineas per head, and in a single season, 1789, it is said that a total of six thousand guineas was paid for the services of Bakewell rams.

The Leicester sheep as it came from the hands of Mr. Bakewell, near the end of the eighteenth century, is described as a white-faced hornless race of excellent mutton sheep with short thick neck, wide level back, thick deep chest, deep quarters and fine bone and bearing a fleece measuring about seven to eight inches in length of somewhat lashy wool, but terminating with a short twisted curl.

About the time of Bakewell's death, one George Culley commenced using Leicester rams from Dishley on the Teeswater breed, which was at that time in high favour as a long-woolled sheep. The stock evolved from this cross is believed to have been the foundation of the Border Leicester, although on acount of the proximity of the home of the Cheviot it it not unreasonable to suppose that in the early years of the Leicester the blood of its white-faced neighbour entered into many of the best flocks. Border Leicester rams soon became as popular as Bakewell's had been, as much as one hundred guineas being paid for the use of a single animal for a season. From that time until the present the Border Leicester has stood in high favour as a mutton and wool-producing breed. The Bakewell Leicester, later becoming known as the English Leicester, was perpetuated in its pure state and is today raised in large numbers in Great Britain and in other countries.

The difference between the English Leicester and the Border Leicester is seen in the head, which in the Border variety is white, and boldly carried, the nose slightly aquiline, the muzzle full, the nostrils wide and the ears erect. The head is clean and free from wool. The English Leicester usually carries a tuft of wool on the head and is also woolled on the shanks. The English Leicester has a bluish-white face; whereas the Border Leicester's face is clear white. In carcass the Border Leicester is larger and longer and the belly is not quite so full in outline, being carried rather higher.

No other race of sheep has been so largely employed as a means of improving other breeds as the Leicester; the Cotswold, the Lincoln, the Shropshire and the Hampshire and many others, directly or indirectly, having through its blood been improved.

Canadian Leicesters are among the best of the Leicester family. Nowhere in the world are finer specimens to be found. This is largely due to the fact that until recent years the American demand for Canadian Leicesters has not been strong and the Canadian breeders have retained in their flocks the best of each year's crop of lambs. By selection and careful weeding many good flocks have been built up. The excellence of the Leicester proves conclusively that if Canadian breeders of other breeds of sheep would follow the same practice, Canadian flocks of all sorts would equal or excel those to be found elsewhere.

The characteristics of the Leicester should, like all mutton breeds, conform in a general way to the standard for all mutton sheep appearing in the first part of this work. The Leicester is one of the large breeds, the average weight for mature rams in good flesh being 250 to 300 pounds, and for ewes 175 to 200 pounds.

The head is small for the size of the body and is carried with pronounced erectness and stateliness. The nose is slightly Roman in rams but almost straight in ewes. The ear is thin, moderately long and carried decidedly erect and alert. The head and legs are snowy white in young animals but become darker with age.

The Leicester is classed among the long-woolled breeds. Its fleece, however, is of somewhat less length than that of the Cotswold or the Lincoln. The wool is glossy and of good fibre and should cover the entire carcass save the head and legs, although a small amount of of quite short wool on the forehead and the shanks is allowable. The wool of this breed hangs in dense spirals which carry their crimp or wave to the skin; the fleece should consist of a mass of distinct curls all over the body and without the 'parting' at the back as in some other long-woolled breeds.

The Cotswold.

The Cotswold sheep takes its name from a range of bare hills in Gloucestershire and Worcestershire, England, which it has inhabited for a very long period. It is said that the hills take their designation from the sheep rather than the sheep from the hills. They derive their name from 'cote,' a sheep-fold and 'wold,' a naked hill. Historians of the breed describe the original stock as being long-necked, rangy, square of build with strong bone and clothed with fine, soft wool. As early as 1464 sheep of the Cotswold breed were by royal consent exported to Spain to the great advantage of the Spanish flocks. This and other evidence seems to point to a fine-woolled breed quite dissimilar to the long-woolled specimens of modern years. For a period subsequent to the date mentioned there seems to be nothing definite written about them. Two or three centuries later Professor Low writing of the Cotswold sheep, gives the impression that they are an offshoot of the Midland long-woolled breed inhabiting the level lands.

From the accounts of various writers, it appears safe to infer that the blood of the original fine-woolled Cotswold and the longer-fleeced Midland sheep were fused in the Cotswold of the eighteenth century. Then the blood of the Leicester was introduced which worked a great improvement in the breed from a mutton standpoint. About this time many of the old pastures were being broken up, turnips and cereals began to be cultivated, bringing about conditions favourable to an increase in weight of carcass and length and strength of wool. Cotswold breeders have for a long time preferred and bred for a bold and open curl in the fleece rather than the close spiral of the Leicester. In the early years of the breed grey or light brown speckles on the face or shanks were not looked upon with disfavour, and even at the present day these markings are to be seen in individuals of many of the best

flocks, although the Cotswold is looked upon as a white-faced breed.

Whatever the origin of this sheep it is certain that for the past seventy years at least it has been kept pure, so that the type has long since been thoroughly fixed. The Cotswold may be described as a big, upstanding sheep. Compared with the Leicester the Cotswold is somewhat larger and stronger of bone. It is not so broad in the back but possesses greater depth of body. In addition the hind quarters are more squarely developed. A distinguishing characteristic of the Cotswold is the topknot or forelock which is seldom shorn close to the head but allowed to hang over the face, extending in some cases to the point of the nose. The fleece is heavy, wavy and rather coarser than that of the Leicester, and should weigh from 10 to 15 pounds of fairly clean but unwashed wool. It should cover the body in all parts. As a rule the best specimens are clothed to the fetlocks of the hind legs. As in the Leicester the head is carried quite erect. The neck is rather long and in many cases shows lack of plumpness, giving a 'ewe-necked' appearance which should be reduced as rapidly as possible wherever it is found to exist.

The Cotswold breed stands in high favour both in Great Britain and abroad. Numerous flocks of pure-breds and grades are to be found in France, Germany, Australia, New Zealand, the United States and Canada. They are quite hardy and sufficiently prepotent to stamp their characteristics upon their offspring when crossed with other breeds. The average weight of a mature Cotswold ram in good flesh is about 250 to 300 pounds, and of a ewe 190 to 225 pounds. Highly fitted show-yard specimens reach higher weights than these. They require good pasture but do well on moderate elevations that are not too rugged. The mothers are, as a rule, good nurses and are, therefore, adapted to the production of lambs for the early market. The fattening qualities of the breed are good although the flesh is only moderately fine in grain if allowed to reach more than maturity. As a rule stock that is not to be kept for breeding should be fattened and marketed before they are one year old.

The Lincoln.

The origin of the Lincoln breed was a race of heavy-bodied sheep which inhabited the low alluvial lands of Lincolnshire, and the adjoining localities, on the eastern coast of England. These sheep were large and coarse, carrying ragged, heavy fleeces of oily wool that nearly swept the ground. They had flat sides, hollow flanks and big shanks and feet and were deficient in the leg of mutton. They grew and fattened slowly but made much inward fat, although their flesh is credited with being well flavoured and fine in the grain. When the improved Leicester came into prominence, toward the end of the eighteenth century, leading Lincoln sheep breeders obtained rams which they crossed upon their flocks. By this means the coarseness of their stock was much reduced and in time a new and finer type of the breed was produced.

With improvement in the sheep stock there came a more advanced system of farming, in which heavy crops of roots and fodders were the chief production. With the consequent better feeding of the stock and the increased care given to breeding, the improved Lincoln became fixed in character as the heaviest producer of mutton and wool in the world. It is chronicled that in the early days of the breed two-shear sheep frequently dressed over 90 pounds to the quarter, and a ram 14 months old gave a fleece weighing 26½ pounds.

The Lincoln was first recognized as a pure breed by the Royal Agricultural Society of England in 1862. Previous to that date all of the long-woolled breeds were shown together, and according to reliable history the Lincolns were usually victorious. They were then, as now, an excellent breed of wool and mutton sheep. They mature early, fatten easily and make rapid gains for the food consumed, but

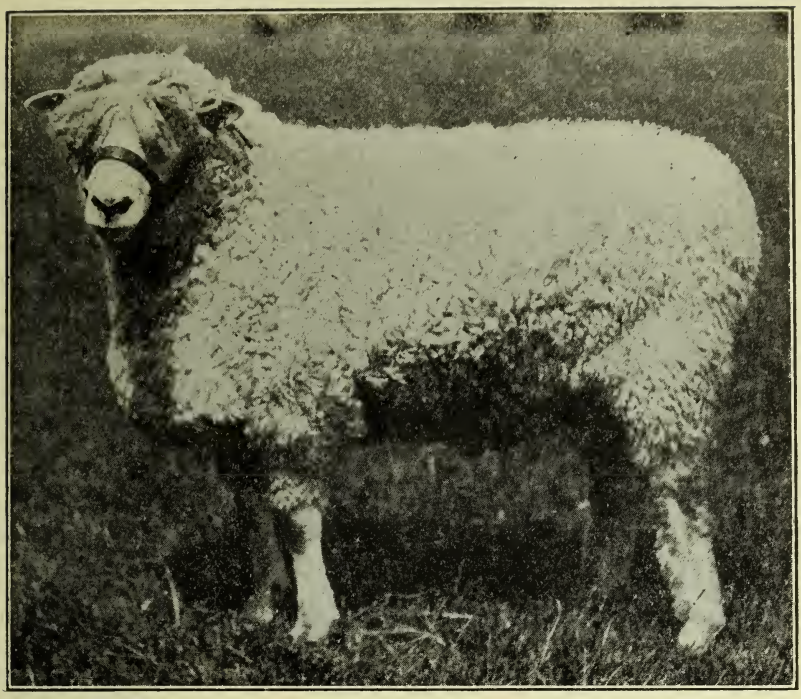


Fig. 8.—Cotswold Ram.

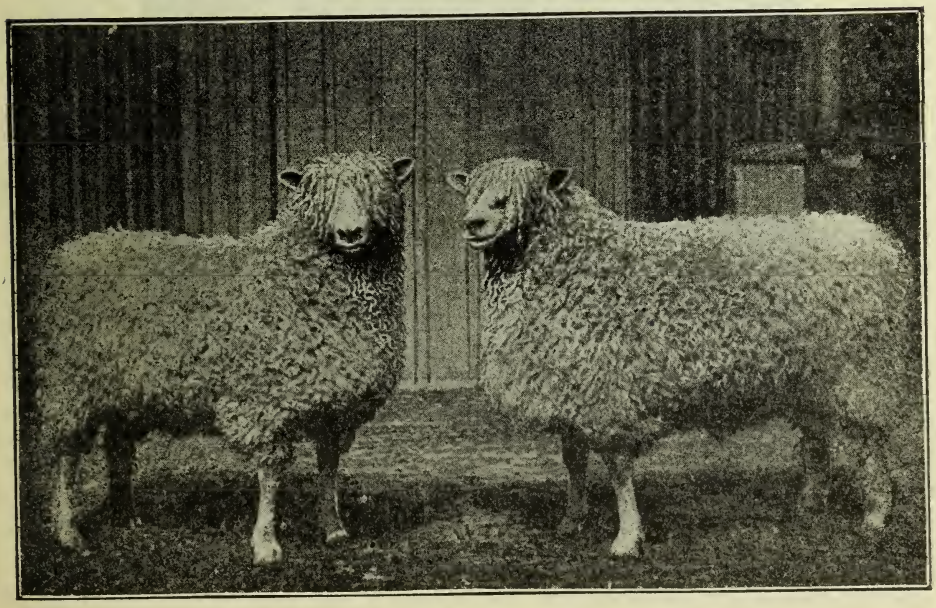


Fig. 9.—Pair of Cotswold Ewes.

Fig. 10.—Lincoln Ram.

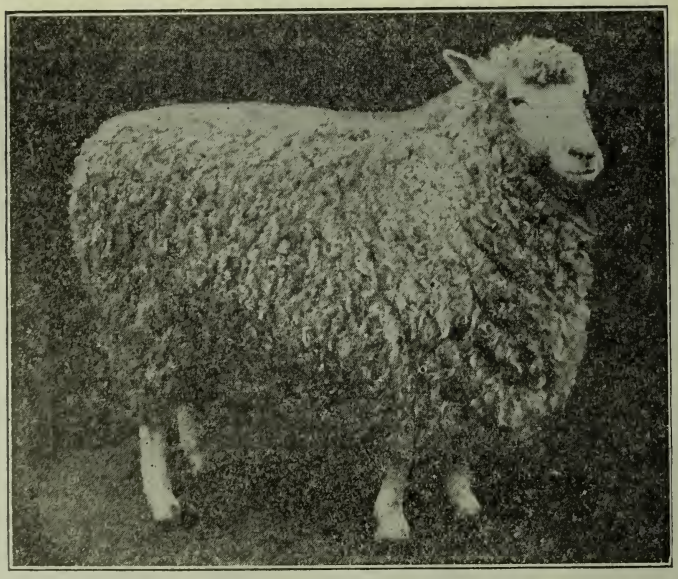


Fig. 11.—Lincoln Ewe.

on account of their size require plentiful supplies of food. Their flesh inclines to coarseness after the animals have reached maturity, but lambs and yearlings dress well and produce meat of good quality.

The wool of the Lincoln is unexcelled for weight of fleece and length of fibre, and its fineness is about equal to that of the Cotswold. It is highly valued for the manufacture of coarse worsteds and is in special demand for braids and other manufactures which call for long fibre and great strength. The usual clip of well kept flocks runs from 10 to 14 pounds for ewes, and 12 to 18 pounds for rams, of unwashed wool. A year's growth of wool is about eight inches.

As a grading sheep the Lincoln stands high where greater weight of carcass and fleece are desired, but for the best results the grade offspring should not be kept on sparse or rugged pastures. Lincoln rams have for many years been in keen demand for increasing the size and fleece of grade Merinos in the Western States of the American Union, Argentina and Australia. At the annual sales of some of the leading breeders in England rams bring very high prices, many of the best specimens going to Argentina. The chief outlet for the Canadian breeders is the western range States which each year take a good number at paying values.

The breed is white-faced and has a conspicuous tuft on the forehead. The head is massive, but not coarse; the nose is somewhat arched and bare of wool. The brisket is full and deep, the body round and well proportioned, and while it is a heavy sheep it is not coarse. It does not reach the weight of its progenitors in carcass or fleece, but on account of the improved quality, brought about by many years of continuous, careful breeding, it is very desirable for its mutton and wool and for the improvement of the common flocks. Mature rams in good flesh reach average weights of 250 to 325 pounds, while good specimens of ewes tip the scales at from 220 to 250 pounds. Highly fitted show-yard specimens frequently reach greater weights.

Compared with the Leicester and the Cotswold, the Lincoln is more massive than either but more nearly resembles the later in outline. It is rather less active, carrying the head lower on account of possessing a shorter, thicker neck.

The Oxford Down.

The Oxford Down sheep is the product of a cross between the Hampshire Down and the Cotswold. The union was deliberately made by two or three distinguished sheep breeders about the year 1833. It was the desire of these men to combine in one breed the diverse qualities of the long wool and the short wool classes of sheep. In great measure they were successful inasmuch as a large sheep of dark countenance and legs, with Down conformation, and wool of moderate fineness has been evolved. The founders of the breed were Messrs. Samuel Druce, of Eynsham; John Gillet, of Braize Norton; William Gillet, of Southleigh, and Nathaniel Black, of Stanton Harbour. These leaders in the sheep breeding industry lived within half a dozen miles of each other and were joined in their enterprise by Messrs. John Hitchman, of Little Hilton, and J. L. Twyman, of Whitechurch Farm, Hampshire. It is claimed by historians that Southdown blood entered into the foundation stock, but since this breed and the Hampshire Down inhabited districts only a short distance apart, and the type of neither was well fixed at that early date, it may be safely inferred that neither was strictly adhered to in the search for suitable animals for the Down cross. In the first crosses the male was Cotswold and the female Hampshire Down, or in a few cases Southdown. There appears to have been a good deal of intermingling of blood before Oxford Down breeders settled into a line of their own. Mr. Druce decided the best results were secured when cross bred animals on both sides were employed. It was not uncommon for cross bred rams to be used on cross bred ewes that possessed the desired qualities; ewes that were

Fig 12—Oxford Ram

Fig. 13—Oxford Ewe

undersized were bred to Cotswold sires, and Down rams were mated with the graded females of coarser type.

For many years the breed was known by various names. As late as 1853 they were known by some as 'Half Breeds,' and by others as 'Down-Cotswolds.' Some four years later at a meeting of breeders held in Oxford the name 'Oxfordshire Down' was agreed upon. Soon after this the more easily pronounced 'Oxford Down' designation was adopted. Since that time no outside blood has been introduced, development and improvement being accomplished by perpetuation of carefully selected stock within the breed itself.

For many years the flocks of various breeders bore dissimilar characteristics indicated in fleece and face due to a preponderance either of the long or the short woolled parentage. This, however, had practically disappeared before the close of the past century. The speckled face has given way to an even brown which may vary slightly in shade without risk of disfavour. The finely cut profile and thinner nose, together with the long and moderately fine ear are undoubtedly vestiges of the Cotswold parent, while the dark face and comparatively close fleece are derived from the Down. Until recent years the upstanding characteristics of both parent breeds were conspicuous in the Oxford, but the winners at leading shows at the present day are of more compact form not unlike the larger type of Shropshire in general conformation. This more solid form has been striven for in the effort towards earlier maturity in accordance with the general tendency in the breeding of all meat producing animals of the farm.

The Oxford Down is one of the largest and heaviest of the Down breeds, approaching very close to the Hampshire in this regard. A well fleshed typical ram should weigh from 250 to 275 pounds and a ewe about 175 to 220 pounds at maturity. On account of its large size and the environment of its home the Oxford Down is better adapted to arable than rugged land. It matures early and fattens well on moderate feed. Its flesh resembles that of the Down in fineness of quality and even admixture of fat and lean. As a grading sheep the Oxford Down finds favour when increased size and good mutton quality are desired and the lambs are to be reared amid luxuriant pastures or rich forage. Ewes of the breed are prolific and good nurses. The wool is longer and coarser than that of any of the other Down breeds and is less dense over the body. In well kept flocks the average fleece unwashed should weigh from 9 to 12 pounds. Well developed rams frequently exceed these rates at their first shearing.

Compared with the Shropshire, which breed they most nearly resemble, the Oxford is larger in every way; its fleece is more open and longer at shearing time; its head and face are not so dark nor so completely covered with wool, and the head and the ear are longer.

Oxford Downs are to be found in almost every country where improved sheep are reared. They are numerously kept in almost all the provinces of Canada, the United States, Australia, and South America.

The Hampshire Down.

The Hampshire Down and the Southdown are closely related. The ancestors of the two breeds inhabited the chalk lands of the Southdown counties of England since the time of William the Conqueror. The soil on the more easterly of these counties was thin and rugged, furnishing scanty herbage. The sheep raised on these were small in size, compact in form, and noted for the excellence of their flesh. These were the progenitors of the modern Southdown. As the chalk lands extended westward into Hampshire, Berkshire and Wiltshire, the soil became deeper and more fertile, affording better pasturage and heavier cultivated crops. The sheep reared on these lands were larger and coarser than the Southdowns. These were

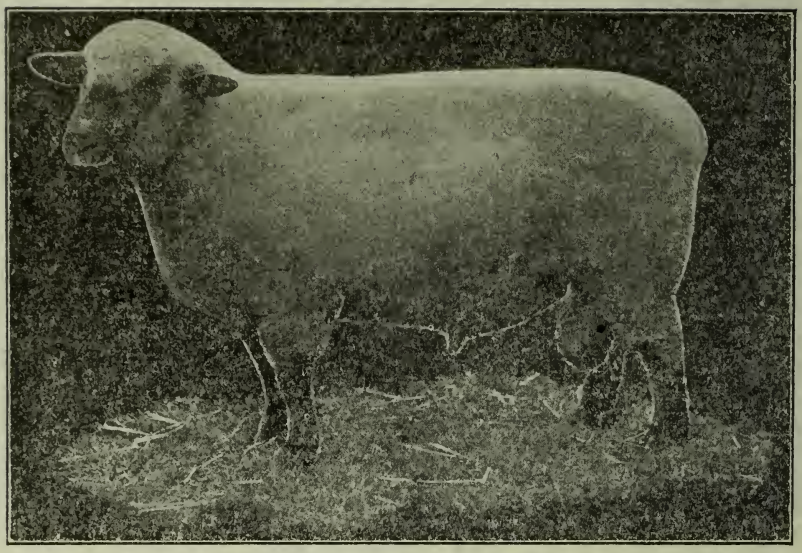


Fig. 14—Hampshire Ram

Fig. 15—Hampshire Ewes

the progenitors of the Hampshire Down. Farther west were to be found in those early days the horned sheep of Dorset and Somersetshire. Through generations the sheep along the border lines of these territories intermingled to some extent so that a well-defined division of breeds was impossible. Early writers state that the flocks of the more northern and eastern of the Hampshire district were more compact and symmetrical in form, with finer wool, than were those in the western portion, where white and speckled ears and faces and curling horns were not uncommon. Farther east horns were unknown and the faces and ears of the sheep were of very dark colour. These differences existed through the period from 1815 to 1835. About this time farming lands began to be enclosed and more careful attention was given to stock rearing. A class of sheep was desired that would thrive well on exposed pastures and when put on roots or other cultivated crops would take on flesh of a high quality economically. It was observed that where the blood of the Southdowns had long been merged with their horned neighbours in Berkshire and Wiltshire, the flocks were best adapted to the ends desired. Improvement by selection and breeding was carried on by many farmers. For a time different sections had somewhat different ideals, and thus the breed lacked entire uniformity, but ultimately the best type was demonstrated and generally acknowledged. It was these animals, claimed to be a cross between the Southdown and the old Wiltshire horned sheep as well as the Berkshire Knot, which formed the foundation of the Hampshire breed.

Foremost among the farmers who undertook the establishment of the Hampshire breed was Humphrey, of Oak Ash, a man who unquestionably possessed the peculiar genius required in a first improver of stock. Contemporaries of Humphrey were Messrs. Lawrence, of Bullbridge, and Morrison, of Fonthill. Humphrey's first pronounced improvement of the breed was effected by the introduction into his flock of a Southdown ram, bred by Jonas Webb, which won first prize at Liverpool about 1834. The difficulty arising from this cross was loss of size, and to obviate this only the largest of the Hampshire Down ewes that suited his fancy were selected for his breeding flock. These were bred to the most masculine and robust of the rams of his own breeding. This policy succeeded even beyond the hopes of Humphrey himself. He seldom bought ewes, and never unless possessed of extraordinary qualities. A ewe thus bought, bred Jack Tar, by a ram of famous strain. Such blood was used with great caution and never directly. Thus Jack Tar was given a few ewes and their ewe lambs were saved as dams for rams. It was, therefore, only after being well mixed with the blood of the flock that new blood was allowed to permeate it.

The greatest possible care was exercised in selecting the animals that were to be perpetuated. Lambs were judged at birth and those showing weakness or defects were marked for the feeding pen. Only the best of those remaining were placed in the breeding flock, all others being sent to the butcher, and none of this class were ever sold to other breeders.

In using sires Humphrey exercised the utmost caution. Lambs were tried on a small number of ewes and if their offspring promised well the ram was again used as a shearling, and in subsequent years, but if not he was sent to the butcher. He never bought rams from others and he never introduced strange blood straight into his flock. Humphrey died in 1868, when his flock was dispersed. Many of his rams sold from 40 to 60 guineas each, one of the keenest purchasers being Rawlings, whose methods of breeding had been much the same as those of Humphrey. His success as a breeder lay in rigorous selection and careful introduction of the best obtainable rams, which were usually secured from Humphrey.

The Hampshire is the heaviest of the Down breeds, and is excelled in weight only by the Lincoln and the Cotswold among the long-woolled races. Mature rams

Fig. 30—A Flock of Hampshire Lambs.

in good flesh should weigh from 250 pounds to 300 pounds, and mature ewes 175 pounds to 225 pounds. The breed matures very early and for that reason is a favourite for getting heavy lambs for the spring trade. The ewes breed well and yield an abundance of milk. While the Hampshire stands well off the ground, it feeds up readily and carries a thick fleshy body of prime mutton. The fleece of the Hampshire is dense and about equal in fineness to that of the Shropshire. Well kept flocks shear fleeces of about 8 to 10 pounds of unwashed wool. The colour of the head is a dark brown with a small top-knot which should consist of white wool. The ears are large, free from mottles and fine in texture; they are carried lower than in other breeds. The shanks also should be of dark brown colour and free from mottles.

The breed is well adapted to either pasture or pen feeding. In its native home on many farms more than a breeding ewe per acre, besides large herds of cattle, are maintained in excellent condition in seasons when fodder is plentiful.

A society for the promotion of the breed and the regulation of a Flock Book was established in Great Britain in the year 1889, in which a similar organization was formed in the United States.

The Shropshire.

The Shropshire as a pure breed is a production of the nineteenth century. It appears to have had a mixed origin, the foundation being a rather diminutive breed, described in 1792 as the Morfe Common sheep, then raised in large numbers in the district of Shropshire, England. These active hardy sheep had at that time black, brown or spotted faces and carried horns. The carcasses of well-fed wethers would weigh from 10 to 14 pounds per quarter, and the fleece about 2½ pounds. This appears to have been the parent form, and the work of improvement commenced with crossing with the Leicester and Southdown. While these crosses were being introduced and for a number of years afterwards, the stock produced was of somewhat uncertain type, but by the middle of the past century a well fixed and very desirable class of the Shropshire had been evolved. Soon after this time, through the efforts of their breeders they were recognized as a distinct breed. They were at that time described as being without horns, with faces and legs of grey or spotted colour, the neck thick with excellent scrag; the head well-shaped rather small than large, with ears well set on; breast broad and deep; back straight, with good carcass; hind-quarters hardly as wide as the Southdown, and the legs clean with strong bone. They were hardy, thrifty, and matured early, producing from 80 to 100 pounds per carcass and about 7 pounds per fleece.

By careful selection and judicious mating of its own species, the Shropshire sheep seems to have been brought to a very high state of perfection. In 1853 they received their first recognition as a pure breed by the Royal Agricultural Society of England. Until about 1870 grey and speckled legs and faces and open fleeces were not uncommon, but these markings and other evidences of mixed breeding gradually disappeared. For the past thirty years the colour of the face has been a rich brown, unless covered with wool, as are many of the finest specimens of the breed at the present day, almost to the point of the nose. A little grey or 'mealy' colour about the muzzle is not considered objectionable

The Shropshire sheep was given a classification separate from the Southdowns, Hampshires and Oxfords, as early as 1859, and soon after that year far surpassed any other breeds exhibited in point of numbers. In 1884 the display of Shropshires at the Royal Show, held at Shrewsbury, numbered 875 against less than half that number of all other distinct breeds combined. The breed rapidly spread to every part of the United Kingdom and is now to be found in large numbers in all parts of the world where improved mutton sheep are kept.

No single outstanding breeder, like Bakewell, Ellman or Humphrey, who are

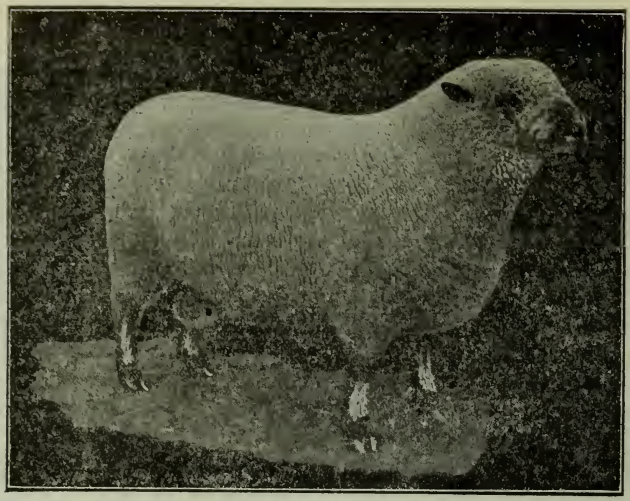


Fig. 16—Shrophsire Ram,

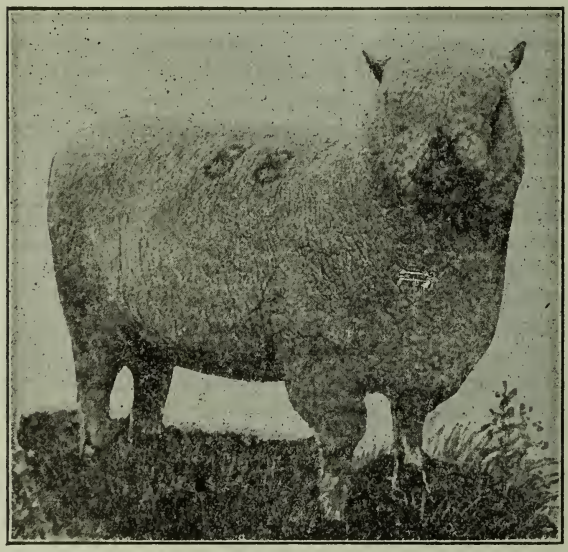


Fig. 17—Shropshire Ewe.

Fig. 18—Group of Shropshire Rams.—A Power for good in a Mutton-raising District.

credited with bringing out the Leicester, the Southdown and the Hampshire, respectively, actually accomplished the chief improvement of the Shropshire. This was shared by many and progress seems to have been gradual.

Going back to the 'fifties of the last century, we find the names of prominent breeders as follows: Messrs. Henry Smith, of Sutton; Green, of Marlow; Harton, of Shrewsbury; Farmer, of Brignorth; Adney, of Harley, and others whose ewes were at that time sold at auction at prices from $40 to $75 per head. The flocks of these breeders and others may be looked upon as the foundation of the present breed and their blood flows in the flocks of the present day.

As a combined wool and mutton sheep the Shropshire holds a prominent place. The body, though larger, is like that of the Southdown, being low-set, thick and fleshy. It carries a large proportion of lean meat which is held in high favour by butchers. The fleece is dense and uniform and approaches that of the Southdown in fineness; ewes shear from 7 to 10 pounds and rams from about 9 to 12 pounds of unwashed wool.

For crossing and grading the Shropshire occupies a wide field. Rams of the breed are very generally used upon common and grade Merino stock in the range districts. Even from quite inferior ewe foundation the offspring from Shropshire males is blocky, thrifty and early maturing, almost invariably showing dark faces and legs. At many of the fat stock shows grades bearing Shropshire characteristics win many of the best prizes. The early maturing qualities of the Shropshire are peculiarly valuable owing to the extent to which they are used in crossing.

Shropshire breed associations are strong, both in Great Britain and America, and pedigree registration is carefully maintained in both countries. The American Shropshire Registry Association was organized in 1884, and up to the end of 1909, about 30,000 animals, bred chiefly in Canada and the United States, had been registered. A large number of pedigrees have also been registered in the Canadian National Records.

The Southdown

The Southdown is the oldest of the improved medium-woolled dark-faced breeds of sheep. It bears much the same relation to the Down breeds as does the Leicester to the other long-woolled races. It is one of the indigenous races peculiar to the chalk hills of the southern counties of England. It appears to have been confined to the Down lands and to have given way to a larger and looser framed animal as the chain of chalk hills on which it browsed passed into the neighbouring county of Hampshire.

Originally, the Southdown was horned, but these appendages have long since disappeared unless as slugs which occasionally appear on rams of the coarser type. The breed, before improvement, was small, long in neck, light in shoulder, bare of back, drooping in rump, but having a big leg of mutton. The fleece was not so close and firm as now, and inclined to curliness.

One of the earliest improvers of the breed was John Ellman, of Glynde, in Sussex, who commenced his work about 1780, and died in 1832. This breeder laid great stress upon the form of the neck and fore-quarters, which he felt should be bold, high in the crest, muscular and thick. These qualities he aimed to develop as well as spring of rib, girth, breadth and fulness of quarter. The leg of mutton, according to Ellman, must be well filled inside and out, and as round as a 'cricket-ball.' The fleece under his care became boardlike in its firmness, and showed cracks down to the skin as the animal turned, presenting a firm and springy surface. Following Ellman came the late Jonas Webb, of Babraham, Cambridgeshire, as an improver of the breed. It was through him in a great measure that the true type was handed down to the present generation.

Fig. 19—Southdown Wethers.

Fig. 20—Southdown Ram.

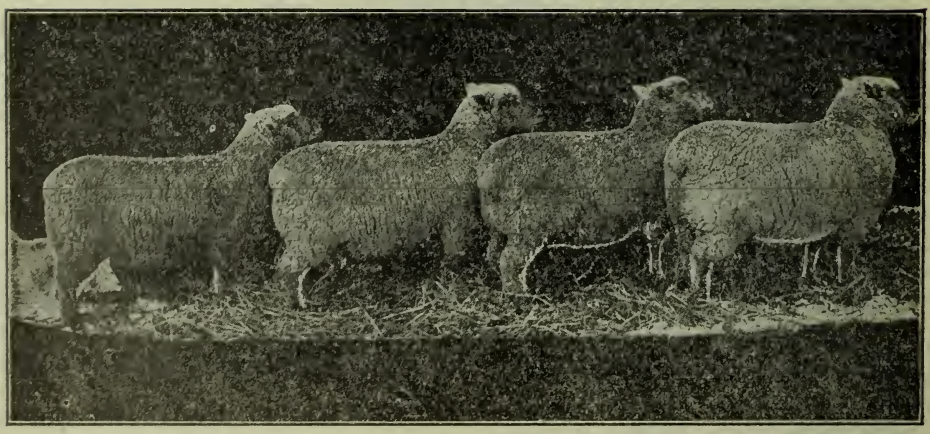


Fig. 21—Southdown Ewe Lambs.

The Southdown is one of the most beautiful sheep existing; its smooth, even body; its round, clean barrel; its short legs, fine head and broad saddle, with its sweet, tender seldom overfat meat, give the qualities which make it desirable to the lawn of the gentleman, while its early maturing and easy feeding qualities give it a place on the farms of the men who must make profit from the products of the land. It is the smallest of the medium-woolled breeds, but owing to its compact form it weighs remarkably well for its size. A well developed ram in breeding condition should weigh about 200 pounds, and in show form from 225 pounds to 240 pounds. Mature ewes should weigh from 150 pounds to 200 pounds, according to condition. It is best adapted to undulating, rolling or broken and hilly land bearing a short, fine herbage, but it adapts itself well to more level areas that are not wet. It matures early, its feeding qualities are unsurpassed and it stands crowding both in pen and field better than most breeds.

The fleece of the Southdown is the finest and shortest of the Down breeds. Unless at times of a shortage of coarser wools the wool of this breed brings a higher price than any of the others. It is dense and as a rule very uniform over the body. An average Southdown will clip from 5 to 7 pounds of unwashed wool.

For crossing purposes the Southdown has been particularly useful and its blood exists in every improved Down breed. On account of its long established characteristics it stamps it good qualities upon its offspring in a remarkable degree.

The face, ears and legs of the Southdown are of a uniform shade of greyish brown or mouse colour. The forehead and cheeks are well covered with wool of the same density and whiteness as found on other parts of the body. The ears are rather small, tolerably wide apart, covered with fine hair and carried with a lively back and forth movement.

The Southdown represents the ideal form of mutton sheep, inasmuch as it is admirably proportioned, of perfect symmetry, very compact and short in leg. It is spirited and attractive, with a determined look and proud firm step.

The Suffolk.

The Suffolk sheep, of which there are only a small number of flocks in Canada, belongs to the Down breeds inhabiting in their early days the southern counties of England. Although larger, more rangy and darker in points than the Southdown, the blood of this latter breed entered largely into the foundation of the Suffolk. The only other breed that entered into the combination was the Norfolk, which appears to have passed out of the list of modern breeds of sheep. The old Norfolks are described as upstanding, robust, active and prolific, bearing horns in both sexes, jet black faces and legs, and clothed with fleeces of fine, soft wool which would weigh at shearing time about three pounds. Their home was the chalky downs in the counties of Suffolk, Norfolk, Cambridge and Essex. The Southdown inhabiting adjacent counties, as already described, is a thicker lower-set sheep, having strong powers of prepotency. Rams of this latter sort were crossed upon ewes of the old Norfolk to form the newer breed of Suffolk.

For the establishment of the Suffolk much credit is given to George Dabito, of Lydgate, who is said to have been an enthusiastic advocate of the Southdown and Norfolk combination. While the name Suffolk was not generally adopted until 1859, when classes were created for this breed by the Suffolk Agricultural Society, flocks are said to date back in purity of blood to 1790.

In recent years the Suffolks have held their own in British show rings in competition with other short-woolled breeds. In 1883, 1884 and 1885, they defeated all others at the shows of the Royal Agricultural Society, and have since won valuable awards in the wether sections in open competition at the Smithfield Fat Stock Show. Appearing somewhat spare of body on account of bareness of head and legs and com-

Fig. 22—Group of Suffolk Ewe Lambs.

parative shortness of wool, this breed does not appeal as favourably to one unaccustomed to them as most of the other Down sorts, but it is on the block, the true test of all meat animals, that they give a good account of themselves. Their flesh is seldom or never over-fat, but fine in the grain and of strikingly fine flavour.

Being active and very hardy the Suffolk subsists well on either sparsely clothed hill sides or more luxuriant pasture. The strong infusion of Southdown blood, together with the care exercised in breeding during recent years, have given the Suffolk early maturing qualities. Flocks produce a high percentage of vigorous twins, which usually develop rapidly on account of the generous supplies of milk produced by their mothers.

The Suffolk Sheep Society of England was established in 1886. The first importation was made to Canada in 1888, and a few flocks have since been established in Ontario, Prince Edward Island and British Columbia. The first Suffolks taken to the United States were imported in 1888, but many have been imported since, and in 1892 the American Flock Registry Association was established.

Compared with other Down breeds the Suffolk more nearly resembles the Hampshire, and at some of the large shows even yet these two sorts are classed together. They are, however, somewhat less in size and weight, but are heavier than the Southdown or the Shropshire. Mature rams in good flesh should weigh from 240 pounds to 260 pounds, and ewes 190 pounds to 210 pounds. They are longer than the Shropshire in body and limb. The head is longer, narrower and bare of wool, although a small patch of short white wool on the forehead is not objectionable. The head and legs are glossy black. In wool production they shear a little more than the Southdown, of a quality about equal to the Hampshire or the Shropshire.

The Dorset.

The Dorset Horn is one of the oldest of the British breeds of sheep. It inhabited from a very early date the fertile counties of Dorsetshire and Somersetshire, situated in the southwest of England. The home of the breed is diversified by hill and dale affording thin chalk highlands and rich clay slopes and valleys. The original Dorset sheep was large, rather coarse, long-legged breed with wonderful powers of maternity. Both sexes have retained horns from the earliest years until the present day. They belong to the medium wool breeds, but unlike most of the others, possess white faces and legs. Efforts to improve the breed by means of out crosses proved unsuccessful, although, according to authorities, both Leicester and Southdown blood were used. While great improvement in form and early maturing has been accomplished in the Dorset sheep during the past quarter of a century it has been effected entirely within the breed itself.

The Dorset surpasses all other breeds of sheep in breeding qualities. Unlike other sorts the ewes may be bred at almost any time of the year, and it is not uncommon for ewes to produce two crops of lambs within twelve months. In England it is not uncommon to find Dorset lambs on the Smithfield market at Christmas when they command fancy prices. A number of breeders both on this continent and in Great Britain aim to have autumn lambs, some as early as September, although many prefer not to have them earlier than January. The Dorset ewe is a most excellent mother, producing seldom less than two lambs and not uncommonly three. She is a very copious milker and when well fed her lambs go forward at a very rapid rate. For this reason the Dorset fills a special field as a producer of what are known as 'hot-house' lambs, which frequently dress from 40 to 45 pounds each at four months old.

In general conformation the Dorset is of the mutton type, approaching that of the Southdown more nearly than any of the other breeds. It is larger than the

Fig. 23—Dorset Ram.

Fig. 25—Dorset Ewe.

Southdown, being almost equal to the Shropshire, and it has less symmetry than either of these sorts. The average weight of mature rams is about 200 pounds and of ewes about 170 pounds.

The wool of the Dorset is much like that of the Shropshire in quality. The fleece is quite dense, very white and elastic. The crown and jaws are covered about the same as in the Southdown. Well bred lambs clip about 10 pounds, and ewes from 7 pounds to 8 pounds of unwashed wool.

The horns of the Dorset curve gracefully forward rather close to the jaws. They are small and flat in the female, but considerably longer, stronger and more angular in the male and curve spirally outward from the top of the head.

As a crossing or grading sheep the Dorset stands in high favour in the United States, more particularly where Merino grades exist. They impart their fecundity, vigour, excellent milking qualities and thick mutton form to their offspring in a marked degree. On account of their horns they are not well suited for crossing upon hornless breeds. If used at all for crossing with the latter sort the Dorset should occupy the female part of the union. Dark-faced lambs produced in this way meet with a readier sale than the lambs of pure Dorset breeding, and when fed for the show-ring they frequently win prizes in the classes for grades and crosses.

Until about 1885 the Dorset was little bred outside of its native counties. During recent years small flocks have been established throughout other portions of the British Isles. They were imported to Canada as early as 1885, and to the United States in 1887. There are now a number of well kept flocks in various parts of Canada and many in the United States.

The Cheviot.

The Cheviot, although not familiar to the sheep farmers of Canada, is becoming a favourite breed wherever given a fair trial. Coming as they do from a rugged country they possess a peculiar adaptability for hilly sections where daily attention cannot be given.

The Cheviot is one of the oldest of the modern breeds of sheep. It is classed with the mountain breeds and comes next in hardihood to the Black-Face that inhabits the Highlands of Scotland. Its home is the hill lands bordering Scotland and England, where they have been reared from a very remote period. In their native homes they are given no shelter and graze the year round on the mountain sides and in the valleys. This open air life has developed in the Cheviot one of the hardiest of the medium-woolled breeds of sheep.

It was about 1756 that an effective attempt was made to improve the Cheviot. During that year four leading breeders visited Lincolnshire and returned with fourteen rams which they used upon their flocks with great success. It is stated that the flock of James Robson, of Philhope, was so much improved by the Lincoln cross that for many years he sold more rams than one-half of the hill farmers put together.

The breed was named about 1792, when it was described as a fine-woolled breed. From 1800 to 1860 the Cheviot sheep was more and more on the ascendant and the Black-Faces disappeared from nearly all of the best farms in the south of Scotland, except in the mountain district of Ayrshire and Lanarkshire. Owing to a series of severe seasons the tide turned in favour of the Black-Faces on all but the lower and grassy slopes of the mountains, where the Cheviot until this day maintains its position.

They are of medium-size, approaching the Shropshire in weight. Ewes weigh from 150 to 160 pounds and rams from 180 to 215. They are white-faced and hornless and are possessed of unusual length of body in contrast with the heath sheep of North Britain. Like most mountain breeds they are relatively light in the fore-quarters, but their hind-quarters are very well developed, producing legs of

Fig. 26—Cheviot Ram

Fig. 27—Cheviot Ewe and Lamb

mutton of very high quality. The mutton of the Cheviot, like that of other mountain breeds, is of excellent quality. It seldom becomes too fat, developing rather a plump carcass of mixed fat and lean which is possessed of fine flavour and tenderness.

The wool of the Cheviot belongs to the middle class. The fleece has a tendency to openness and is somewhat longer and coarser than the best type of Shropshire staple, and is rather superior in quality to that of the Oxford. Ewes shear from 6 to 9 pounds and rams from 8 to 12 pounds of unwashed wool.

The Cheviot is possessed of extraordinary constitutional vigour. It is highly prolific, the ewes yielding twins more than single lambs. The ewes are unusually attentive to their offspring which are rapid growers, making a dressed weight of 50 to 60 pounds at six months old.

In a general way the form of the Cheviot is much the same as other good mutton breeds. The head, while not too heavy, should be bold and broad, well set off by a bright dark eye and erect ears of moderate length. The nose is Roman in type, the skin around the mouth being black. The legs, face and ears are covered with clean, hard, white hair.

The Cheviot is peculiarly adapted to hilly and rolling sections. It thrives well on even scant pasture, provided it has access to an extended area, and fattens readily on roots or good pasture or fodder even without a grain ration. The breed is thoroughly at home in the maritime provinces and the more rugged portions of Quebec, where a few flocks are now being kept.

The Merino.

While the Merino has made great progress in the American republic it has not become a popular breed in this country. In Canada, as in Great Britain, a sheep has to possess at least a fair degree of mutton quality in order that it be taken up either by the breeders or the general farmers who keep a few head of sheep. On the ranges, however, the major part of the foundation stock is Merino, and though the mutton ideal is predominant over Canada as a whole, there are evidences that there will continue to be periodical, if not steady, reversions to Merino blood as long as open range is available. This is not due entirely to the superior herding qualities of the Merino, but to the demand of our growing manufacturers for a grade of wool above coarse or medium. Range wools have greatly increased in value within recent years. This should encourage the progress of sheep husbandry, and in this work the Merino will perform an important part. While our interest in the sheep business has been up to the present almost exclusively concerned with the meat side, it must be remembered that mutton is only one, and not the most important one, of our meat products, while wool is a characteristic and peculiar product and it is on the wool side that we should expect to see the general improvement in sheep husbandry secured.

The Merino is a fine-woolled sheep. It is known to have been bred almost entirely for its fleece since early in the Christian era. For a number of years attention has been paid to the mutton qualities of some families, but as a meat-producer the Merino ranks in sheep no higher than the strictly dairy breeds in cattle. It is quite conceivable, however, that the introduction of the Merino families of sheep to the rich grasses and more rigorous air of the upper temperate latitudes will be attended with an improvement in fleshing qualities and general rotundity of form.

The Merino is of Spanish origin, but large numbers have been so long bred in Germany and France that certain varieties are now looked upon as belonging to these latter countries. For many years importations from various European countries have been made to the United States, where they are bred in more or less distinct classes. These are known as the American, the Delaine and the Ram-

Fig. 28—Merino Ewe

Fig. 29—Merino Ram

bouillet. The American or Spanish is the smallest and lightest in weight and are still bred almost entirely for fine wool. The Delaine is a heavier bodied sheep with fewer or no wrinkles and of varying uniformity according to the view point of breeders as regards the relative importance of fleece or flesh. The Rambouillet or French Merino is the largest of the breed, having been bred and fed for mutton production for many generations both in France and the United States. Weights of individual rams are recorded as high as 400 pounds, and fleeces as heavy as 60 pounds. These, however, are quite exceptional and abnormal. It is probable that such a ram was loaded to the utmost extent with fat and such a fleece with oil or yolk and dirt.

Merinos are reared in large numbers in Australia, New Zealand and Argentina, but as already stated, their poplarity in North America is chiefly confined to the United States, where some thirty or forty years ago about 95 per cent of the sheep were from Merino foundation stock. In recent years the English breeds have been so rapidly introduced and so numerously bred in the United States that the ratio is greatly changed in favour of the mutton sorts. Over the western plains mutton rams are being used almost exclusively until thousands upon thousands of the sheep and lambs that reach the large United States markets bear one or more English crosses upon Merino foundation. Lambs bred in this way readily partake of the mutton form, and when well fed frequently top the market.

From time to time small flocks of pure Merinos have been started in Canada and a small number are being perpetuated in their pure state at the present day, but only as a foundation stock for grading purposes has this breed reached the Dominion in any considerable numbers. To stock up ranges in the western provinces low priced Delaine ewes with some admixture of Rambouillet blood have been imported in large numbers from Montana and other western States, and these are being graded up with rams of mutton breeds. Under range conditions young stock matures slowly and the great bulk of the mutton is disposed of as one, two and three-year-old wethers. Few of the lambs are sold off in the fall for immediate killing, but during the past few seasons several thousand head have been fed through the winter on hay and screenings at elevator centres and have come out in excellent condition for the late winter and spring trade.

The Merino as a breed is among the lightest of registered sheep, the average ram weighing from 150 to 200 pounds, and ewes from 90 to 130 pounds, but among the Rambouillets as high as 200 pounds in ewes and over 300 pounds in rams are occasionally met with. The breed has proved itself adaptable to a wide range of conditions, doing about equally well on sparsely clothed hills and fertile plains. It withstands crowding and neglect and travelling long distances for food better than other classes of sheep. For these reasons the Merino multiplies well in large bands under range conditions where individual attention cannot be given to the members of the flock, though it is not as prolific by habit as are the English breeds.

Favoured Pure Breeds.

In the development of the sheep industry in Canada, the introduction and distribution of the various purebred breeds has been unrestricted and their numbers increased as they attained popular favour among the breeders themselves. Purebred breeders and breed associations naturally sought to popularize the breeding of their own breeds with the result that, in most of the older districts, frequently several purebred flocks of different breeding have been established. In such districts, rams of the different breeds have been used on the grade flocks with the result that market lambs lack uniformity and a definite system of flock improvement has not been made operative. Of late years, sheep promotion work has been

directed with a view to establishing a distinct breed for each community and an effort has been made to curtail the multiplicity of breeds in districts or provinces by encouraging those breeds which have become most generally popular and, in addition, which produce wool and lambs that are highly desirable from a market standpoint. The different provinces have varied somewhat in their selections, but generally speaking those breeds most favoured have been: Shropshire, Oxford, Hampshire, Suffolk, Southdown, and Leicester. In British Columbia, the Dorset Horn has also been named and in Quebec the Cheviot.

ESTABLISHING A FLOCK OF COMMERCIAL SHEEP

The advantages at the hand of any intelligent farmer, who wishes to establish a flock of sheep for use in a commercial way at the present time are very much greater than prevailed many years ago in the older provinces of the Dominion. Then the only material at hand for the foundation of a flock of grade sheep was the 'Common Sheep,' as they were frequently called; and common they were indeed in at least two important ways in which the word is used. They prevailed everywhere on the farms of the Dominion and they lacked every indication of good breeding, as evidenced by the qualities making for a present-day first-class carcass. But they were hardy and looked out for their own sustenance. Yet they were nimble at scaling the fences of those days, and often made trouble between neighbours by feeding on the growing crops.

They were rather long legged, shallow bodied and thin fleshed. Their wool was not very fine, though dense and short and usually quite coarse on the hips and thighs, and worse still, became very scarce before two years old, and quite bare on the under parts of the body.

Those who used these sheep as a foundation for flocks found that it took several generations from the use of good mutton type rams of the pure breeds before their crop of lambs would have the uniformity necessary to success.

At the present time it is quite different, and the beginner has grade flocks practically pure of the several breeds to choose from, and can commence with a selected flock of grades of whichever breed he may fancy, practically pure to the type of the pure-bred. For many years the best breeders of all the breeds have been striving to establish in their respective flocks the same ideal form of carcass, varied only in size. It will be necessary to have this ideal in view when making selections. A well-covered back is required, broad because of well sprung ribs, and wide loin, the flesh smooth and elastic to the touch—if in good condition, and not soft and blubbery. nor yet hard. In no case should the back bone be in evidence to the touch, if the animal is in good flesh. We should look for long deep full quarters, well filled in the twist, and inside and outside muscles of the thighs. In the points given we have the most valuable parts of the carcass. But in addition we require a good depth of rib, good depth and width in front and at the heart, to give room for the vital organs, so we may have sturdy constitution. With these will go a medium length of neck, stronger at the shoulders and well set on. A clean intelligent head and eyes, with nothing sluggish in appearance, bright eyes with reasonable prominence are all desirable.

We must be careful to select ewes with good firm bone, and strong, short pasterns, not set back too far, feet of fair size and good shape, the legs straight and set squarely under them.

We must pay a great deal of attention to the wool also, in making selections. The heavy shearers—when the quality is right—of whichever breed we have, are the most profitable, and in order to get weight of fleece we must have density of fibres, as well as length of staple. It is of great importance to have it uniform in quality all over the body, not running to coarseness on the thighs.

After we have clearly in mind the type we want, then the thing of greatest importance to us, is to have our selections uniform. There is profit in this because we can sell a uniform bunch of lambs to better advantage, and for a higher price. By uniformity more is meant than that the flock be of the same type, and similar in size. It means not only they look alike, but that the individual sheep be uniform in itself, that it has general uniformity, good conformation, not weak in places and extra good in others.

An Established Farm Flock.

Selecting a Ram

In selecting a ram, too, this individual uniformity is particularly important, since in this at least he is really half the flock, and with his better breeding is likely to reproduce his conformation and type in the lambs.

A medium size will be found the most desirable, with an inclination to good size rather than undersize if varying any from medium. Roominess should be looked for in the ewes, as those of that form will be more likely to be good mothers. Avoid a ewe that is short in the ribs and has a 'tucked-up' appearance. In the ram we must have the same good qualities of carcass and of wool, and should look for more compactness and strength, in appearance a good lot of masculinity, a strong, bold carriage, stronger bone, and with all not any above the average size for rams of his breed. He must be pure-bred and typical of the breed we have selected. It is almost invariably a mistake to cross, except for a special purpose. Continuous indiscriminate crossing is always suicidal.

The Size of the Flock.

A flock of fifteen ewes should be the minimum on a farm of one hundred acres which is devoted to mixed farming. Such a flock can be increased with experience, but not beyond twenty to twenty-five, unless it is desired to make a special business of sheep raising. With good management and good care, an increase through lambs can be expected of from 150 per cent to 175 per cent, and it should be the latter.

A flock of this size will, if given opportunity, clean up a very great number of the weeds on a farm, yet we must not make the mistake of expecting them to get all their living off the weeds and waste places of the farm, even though it is a good help. Provision for feed supplementary to the pasture, such as rape, which can be very cheaply produced, is generally very profitable, and should always be counted on. Lambs after being weaned gain in weight very rapidly on rape, and when oats are fed along with it towards the finishing for the market, the flesh is firm and good, likely to bring the highest price. If fed on for marketing in winter and spring, which is usually the most profitable, the rape makes a good foundation for the winter feeding. These supplementary foods are desirable to develop the flock profitably.

Time to Purchase Ewes.

The best time to purchase the ewes is August, just after the lambs have been weaned. We can purchase then as cheaply as at any time and can make the best selection if choosing ewes that have raised lambs as their milking qualities and strength can be ascertained. Besides we will have them in good time to prepare for the next crop of lambs.

While there is one additional year's usefulness in a shearling ewe—one that is sixteen or seventeen months old, if she has not had a lamb—as a rule two-shear ewes are to be preferred in selecting. We have then a guarantee that they are breeders, and have the advantage of being able to judge of those likely to be the best breeders and best milkers. However, very few shearling ewes prove non-breeders. These ewes should have the run of the stubble fields, not sown to clover, or old pastures, until near the middle of September and then given access to a rape or clover field. If this green food is not plentiful, it will pay to feed a small quantity of grain to make sure the ewes are strong and thriving well when bred. This is the secret of having a large percentage of twins dropped. It may be well, as claimed by some, to breed from ewes themselves twins, but even so, they must be strong and thriving

well to have the best results because not only will we have larger returns, but the lambs will be stronger and more likely to live and do well, providing the treatment of the ewes continues good up to lambing time.

Mating

The ram also should be hearty, rugged and healthy at the time of coupling. Usually stronger lambs are sired by rams one year old or over, yet for a flock of about fifteen ewes, a well developed lamb will give good results, and may be more cheaply purchased, as well as being a year younger and perhaps more valuable when a change of ram is to be made. But when the number of ewes runs up to twenty or more, then an older ram should be secured.

In case a lamb is used on from fifteen to twenty-five ewes, which should be avoided if possible, he should not run with them, but should be kept separate or with, say one ewe for company, and allowed with the flock only long enough each morning to serve once such ewes as are ready. More than that is needless and helps to destroy the vitality and usefulness of the ram. If short of help, or if one does not wish to take the time, which need not be much, a ram may be allowed to run with a small flock of ewes during the mating season without much apparent injury, if the ram be matured. However, it is profitable to control a lamb, as he is often more ambitious, and more likely to injure himself, and naturally produces weaker lambs. The profit from the flock is largely dependent upon the number of uniformly well grown lambs we raise, and which we can have by these reasonable precautions, and after care and attention, if the ewes are good milkers.

Wintering

The flock should be strong and in good flesh when winter sets in, and they will be, if reasonable provision has been made for fall feed. If in good condition they will be the more cheaply wintered. They can be kept doing well on clover hay and a few roots—say three pounds per head each day and a liberal feed of pea straw. If a little grain be fed for about four weeks before they lamb—one pound per head each day of mixed oats and bran is good—they will be in good condition when lambing time comes. The grain feed should be doubled after lambing and the quantity of roots (mangels or turnips) increased to nearly all they will eat. This will insure a good flow of milk, and it is during the first two months a lamb is sent on the road to profit or becomes stunted and small. After that age they can more easily be helped by other foods.

The reason for not feeding the ewes largely with roots before lambing is that they are bulky and cold, being largely composed of water and when eaten in large quantities seem to affect the fœtus so the lambs are born soft and weak and very difficult to save. Either turnips or mangels may be fed to ewes with safety, although very many prefer turnips before lambing and mangels after, because the latter are considered better milk producers. But mangels should never be fed to rams. They have the effect of producing stone in the bladder, and sometimes cause serious loss. Turnips do not have this effect and sheep should have some succulent feed when not on pasture. Ensilage is not a safe food; it often, or generally is too acid, and will cause severe indigestion, which will in turn cause a loosening of the wool by feverish heat in the skin, and much of the fleece is often lost besides lowering the vitality of the sheep.

Lambing Time.

The lambing time is the only one when for a few weeks the flock is exacting of the time of the shepherd and his attention. It is very profitable to be often with the ewes at that time to see that the lambs when they are dropped are not allowed

to get chilled or become weak for want of a little nourishment soon after they are born. It is well to have a few little pens. which can be readily made with movable hurdles in one end or corner of the large pen. The ewes seldom refuse to mother their lambs when they are separated from the flock, and alone with them. Ewes seldom require any assistance in lambing but often a little prompt help to a weakly lamb will save its life, and after they are once on their feet, and have found the teat, are very little more trouble, unless the ewe is a poor milker, when it will be profitable to assist the lambs with a little cow's milk until they eat well.

Their tails should be docked when the lambs are not more than ten days old. If left longer, or until they get very plump and fat death sometimes ensues from the shock, and occasionally from loss of blood. The latter can often be prevented by tying a cord tightly around the tail just above the place of cutting, and danger from the former is lessened by cutting one joint or so longer. The ram lambs should be castrated at the same time.

Shearing and Dipping.

Shearing should be done as early in the spring as possible. The beginning of April is usually a good time. Very soon after the ewes have lambed, or, if they come in later than that, then before they have lambed. If not shorn until after lambing, then all tags should be trimmed from around the udder before or immediately after lambing. If this is neglected, the lamb sometimes will suck these tags and swallow them, frequently causing balls of wool to form in the stomach, which causes inflammation and death. This occurs also sometimes when sheep are allowed to get very much infested with lice or ticks, causing them to bite and pull out their wool, swallowing a portion of it, and the balls form in the same way.

Just as soon as the weather is warm enough in the spring, all the sheep and lambs should be well dipped in some of the good dips that are sold. A vat can be very cheaply made for this purpose and the work quickly done. They should be dipped again in the fall, before the weather gets very cold. A half-day for the purpose is a very profitable investment; vermin left on the sheep to go into the winter will be very expensive for the owner.

The Flock at Pasture.

After the flock has gone to the pasture, they will not be much trouble except to see that they have plenty of clean water and salt. To have plenty of clean water all the year round is very important to insure the thrift of the flock. Do not let them depend on snow in the winter—they will not do so well—nor let them drink from a stagnant pool at any time. They are very liable to take parasites into their system, which will cause trouble. If it can be arranged to give the flock a change of pasture every two or three weeks, and not necessarily to better pasture, they will thrive and do much better. To alternate them between two fields every few weeks will answer the purpose.

Weaning.

August, from 1st to 15th, is a good time to wean the lambs. They will do better after that if separated from the ewes, and are given a nice fresh bit of clover or rape to run on, and besides it gives the ewes a chance to recuperate and gain in flesh. The ewes' udders should be watched closely for a short time after weaning, and stripped out, when necessary, until the milk has left them. If any have bad or spoiled udders they should be marked for drafting out, and careful note should be made of which are the best milkers; one of the most important things that make for

success is in having the ewes good milkers; other things being equal the good milkers raise the best lambs. The lambs' as well as the ewes' tails should be trimmed neatly square across up to the stump of the tail before being turned on fresh green feed such as rape or clover, so they will not soil their wool so much behind if they become soft in their dropping, which they often do.

Precautions in Rape Feeding.

When lambs or ewes are turned into rape they should have access to other pasture, else sometimes their ears, and occasionally the whole head will swell, and blister as when frozen, and often the ears will drop off. If allowed other pasture with the rape there is very little danger. Sometimes losses come from bloating when the sheep or lambs first have access to the rape, or even to fresh clover. But this can be avoided by a little reasonable care. They should never be allowed to feed on the rape the first time when any moisture from dew or rain is on the leaves. A nice sunny afternoon is a desirable time, and then they should have had a hearty meal of some other food before being turned on. They will eat greedily of the rape at first, but afterwards will take several days before they will fill up on it again, and then the danger is past if they have other pasture on which they can feed at will. Further reference to precautionary measures necessary in rape feeding appears in the chapter on 'Feeds and Feeding.'

Before sheep are allowed into any field after July first, where they have not been before that summer, all burrs of any kind or 'pitchforks' should be carefully removed. If permitted to get into the fleece they are unsightly looking, and depreciate the value of the wool.

Culling Out.

The ewe lambs from the best ewes and the best milkers should, if well developed, and promising, be marked at weaning time, and from these the selections should be made to keep in the flock, always being careful to retain those as near the ideal type as possible. They should be liberally fed to insure growth and development, but it is not necessary to feed extravagantly at all. They should not be bred until they pass one year old. If bred when lambs they are retarded in their growth and seldom make as vigorous ewes. Their lambs are often smaller, and not of so much account. The best of these shearling ewes should be selected in the fall to replace those drafted from the ewe flock for any reason. But do not cast out an old good ewe that is also a good breeder and milker for a young ewe unless her teeth have failed or for spoiled udder.

The ewes will now be used the same way as described for the first year. Those with defective udders or which have proved unthrifty and those that are not good milkers should be drafted and fed with the wether and ewe lambs for market, their places for this year being filled by purchase.

If the lambs are to be sold in the fall, say October, they will generally give a profit for a small feed of grain each day, yet, if the green feed be plentiful they will usually be fat and heavy enough without any grain.

Before being offered for sale they should be made as presentable as possible, by trimming their tails nicely, as well as all tags, &c., that may detract from their appearance. Some successful shepherds say it pays well to wash them carefully if they be long wools, and probably they are right; it certainly improves their appearance very much. Generally it will be found most profitable to keep the lambs over until March, feeding them well with clover, hay, roots and some grain. At that season they are suitable for export either to the United States or to Great Britain where heavier lambs are desired. In addition to the large gain they will make in

weight they usually bring a much better price per pound. If it is desired to establish a special sheep farm, or devote the whole farm to sheep raising it will be still better for the beginner, if without sheep keeping experience, to have only a small flock at first, as already described, and the flock will usually increase as fast as the average man can prepare and accommodate his farm to the special purpose, and furnish suitable housing, yards, &c. Possibly, if the farm be not suitable for any other kind of farming, that is, very rough and hilly, he may begin with a larger flock, but even under such conditions, he had better go slowly until he has had a year or two of experience. In any case, to have success with sheep raising, as with any other business, a man's close observation and individuality will play a very large part in use of good judgment.

TYPES OF MUTTON SHEEP

Type in mutton sheep and profit in the industry are closely associated and these are greatly influenced by the character of the breeding of the flock. The standard of type or quality is the fitness of the animal for the purpose for which it was raised. Unless the sheep yields a plump carcass of palatable and nourishing mutton and a fleece of wool suitable for the manufacture of high-class fabrics it is a failure and not worthy of the shepherd's care. Unless it can do this economically, or sufficiently so to leave a profit to its feeder, it lacks something that its owner should endeavour to supply in the succeeding crop of lambs.

Fortunately the better the breeding, or the more improved blood a sheep contains, the better carcass it yields and the more economically it is reared and finished for the market. Improvement of breeds has been in the direction of development of the parts of most value on the block together with increase of carcass to live weight and the hastening of maturity. The pure-bred sheep, or the animal that possesses the characteristics of the pure-bred, and these are never found in the common unimproved specimen, is the cheapest to raise, earliest to mature, and sells for the highest price per pound. The advanced mutton raisers recognize this and invariably use the pure-bred sire, knowing it is the profitable course even though the ram cost two or more times as much as even a good grade could be bought for. He knows the improvement he will make is assured and in large measure permanent even to all the generations that follow. With every succeeding improved cross uniform excellence is more firmly established until the flock ceases to give inferior, unprofitable stock. Each ewe is a good mutton sheep and when mated with a strong, pure-bred male, barring accidents, ill-health and bad treatment, she yields a lamb of assured excellence. The type has become fixed and she cannot do otherwise.

How many sheep raisers fail utterly to appreciate this simple, self-evident truth, and how dearly they pay for their backwardness. In every province the grade, and in many cases the scrub sire is still in use. In like proportion are inferior lambs being raised. To learn the causes of the differences in the quality of lambs from different sections the writer visited districts noted for poor, fair and good lambs. Directed by extensive sheep dealers familiar with the several sources of supply, camera in hand, journeys were taken and farms visited. Unfortunately the wildness of some of the most inferior specimens made photographing difficult and representatives of a number of run-out flocks seen cannot be published. Enough are shown, however, together with the figures representing the weights of shipments to teach the important lessons.

District No. 1, representing wide areas in each of several provinces, turns out a class of lambs of unspeakably poor quality. The weights run in October and November from 50 to 75 pounds, with an average of little more than 60 pounds. They are not only light, but poor, unprofitable specimens, alike to the raiser and the butcher that sells them to the householders. Their legs are long, thighs thin and backs bare, presenting little for the cook to do much with. In the shambles they dress out very light carcasses—not over 45 per cent of their live weight. For this reason the dockage by the drover is heavy, which leaves the grower a very small return for his lamb crop, so small indeed that he doubts whether or not sheep raising is a profitable industry.

The camera reveals some of the secrets of the inferior stock. Such a thing as a pure-bred sire is unknown in this district, and it is difficult to find even a passable grade at the head of the flock. As a rule the most upstanding, lusty lamb of his or his neighbour's unimproved flock is brought into requisition year after year, with the sure result of a run-out, degenerated race. It is in these sections that the black lamb is most common, and he is almost invariably a light weigher wherever found.

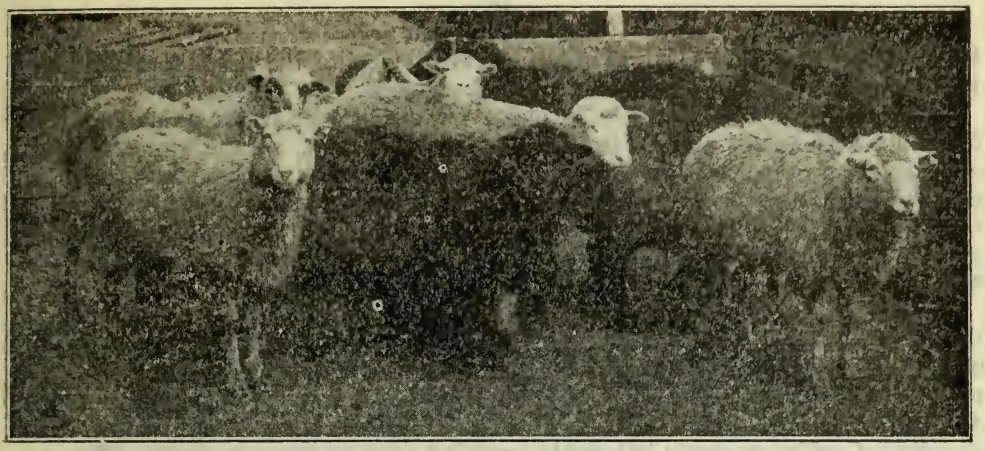


Fig. 31—Group of Scrub Ewes

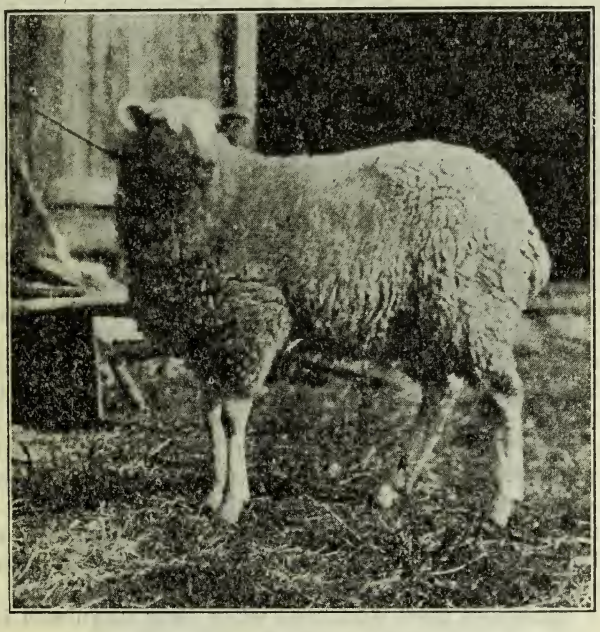


Fig. 32—Scrub Ram

Fig. 33—Group of Scrub Lambs.

Figs. 31 and 32 show a ram and group of ewes typical of the stock in district No. 1, while Fig. 33 truly represents the lambs from these.

Bad breeding is not entirely to blame for the inferior lambs produced. The flocks are little valued and are fed and housed accordingly. In the winter they receive little more than straw, and no matter how bare the pasture becomes in summer no extra food is given. Ticks hold full sway, and the division of the sexes is not thought of until the lambs are shipped out to market. It may be noted that the average clip in many unimproved flocks is not higher than from 4 to 5 pounds per head.

From district No. 2 lambs running from 60 to 80 pounds are produced. Here the value of improved blood and better methods of feeding are beginning to be recognized. The common ram is giving place to the grade, and occasionally a low-priced pure-bred is brought in. With this forward step better feeding and care are naturally exercised, with improving stock as a consequence. Grade sires are being used in this district, which is slowly but surely emerging from primitive methods. Here we find an occasional man growing roots and clover hay for winter feeding, while some attention is being given to castration and the general welfare of the stock, with the result that the majority of the lambs surpass the weight limit that entitles them to the top market price. The flocks shear from 6 to 8 pounds per head, and on the whole the sheep industry is in a prosperous condition.

District No. 3 produces a very good class of lambs, many of which find their way to the most discriminating markets. They are well fleshed; many of them wethers, which command the best price in any market. They weigh from 80 to 110 pounds each in October and November, and dress out from 55 to 60 per cent of carcass. The owners here have long since given up the use of grade sires, and many are not afraid of a fairly stiff price for a good ram. While sires of most of the mutton breeds, including the Shropshire, Southdown, Oxford, Leicester, Cotswold and Lincoln, may be found in perhaps only slightly varying proportion, the photographs of only two breeds, Leicester and Oxford, were secured. Figs. 36 and 37 represent rams in service in grade flocks. Fig. 34 shows a group of grade ewes, while Fig 35 represents lambs produced by such parentage. In these flocks lambs grading as culls are never found; in fact practically one hundred per cent of the lambs are of good quality, commanding not infrequently a price slightly in advance of the highest published quotations. Even on a glutted market these well bred lambs will sell, as buyers are constantly on the outlook for choice stock.

Many of the grade flocks show the result of changing from long wool to Down sires. Broad backed, massive dams, some with brown, others with speckled or grey faces, are the pride of their owners on many good farms. They shear from 8 to 10 and occasionally 12 pounds of good wool, and when their usefulness in the flock is past they quickly fatten up and sell for a good price. The highest quality of carcass is produced by these ideal mutton sheep. It gives a thick cut of muscle or lean meat, and has sufficient fat to suit the fastidious palate.

Districts Nos. 1, 2 and 3 are not circumscribed by definite geographical boundaries. The first, as may be inferred, represents the thoroughly backward localities, where the soil is inferior, farmers poor and lacking in enterprise. The second occupies a wide and scattered territory, even reaching into good agricultural sections where, unfortunately, second-rate farmers are too often found. As a rule district No. 2 occupies what may be termed the 'back townships' of moderately progressive counties. In this district owing to peculiarly favourable conditions for sheep husbandry many good lambs are raised, but the high percentage of culls renders the average of quality comparatively low.

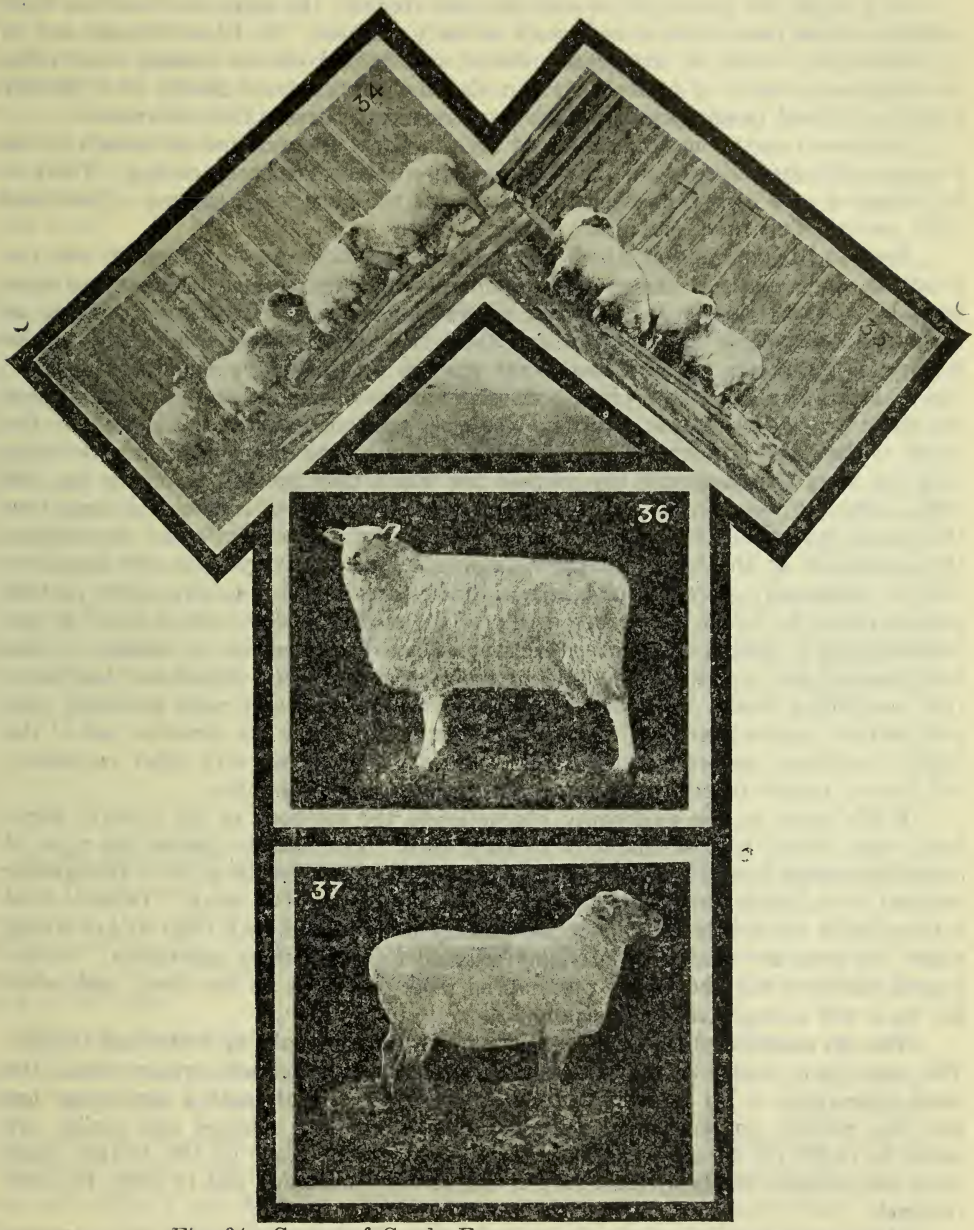


Fig. 34—Group of Grade Ewes
" 35—Group of Grade Lambs.
" 36—Leicester Ram at Head of Grade Flock.
" 37—Oxford Ram at Head of Grade Flock.

MUTTON PRODUCTION IN GREAT BRITAIN

In Canada the raising of mutton has not received the attention that has been accorded to the production of beef, pork or dairy products. In Great Britain, and to a considerable extent in the United States, commercial mutton raising constitutes an important branch of agriculture. In Canada it is confined chiefly to a limited branch of mixed farming, and as such receives comparatively little attention.

Nowhere is better mutton produced than in Great Britain, and no branch of the live stock industry in the 'Old Land' is more profitable than sheep raising. There it is conducted as a highly specialized industry for the purpose of gaining a livelihood after paying high rents and other heavy expenses.

Both in England and Scotland the flocks of breeding ewes run high up into the hundreds, and each is in charge of an intelligent shepherd trained in many instances from his boyhood in the management of sheep for profit. In many cases one or more under-shepherds are engaged and these men devote their whole time to the tending of the sheep. It is realized that what is worth doing should be well done, and with this idea only the profitable members of the flocks are maintained and these are made to yield their best returns. The crop rotation followed is dictated by the needs of the sheep and when food is purchased due consideration is given to securing only the sorts that best suit the purpose for which they are fed. So long has the sheep industry been established in Britain upon an extensive commercial basis that the general system of feeding and breeding varies comparatively little and then only as the conditions of the land and environments demand. Everywhere the succulent root is extensively grown, and wherever sheep are reared specially sown pasture grasses are to be found. It is also a rule of the mutton maker to feed 'cake' to the fattening stock, though its purchase demands a heavy expenditure of money. It has been learned that a thrifty condition of the system is of first importance and after that nourishing food. The outdoor life of the stock, together with succulent root and pasture rations guarantee the health of the sheep, while the generous use of the highly nutritious compressed linseed or cottonseed meal given with other concentrated food is turned to good account in the systems of the animals.

While more or less uniformity characterizes the methods of old country shepherds most flocks have a character of their own. The breeder carries his type of sheep about with him in his mind's eye and it is the impress on the mind of the breeder reduced to palpable form that guides his selection of breeding stock. Defects from a breeding or marketing standpoint are quickly noticed, and such rams as are strong where the ewes are weak are invariably selected for the coming generation. A successful shepherd will not forgive pronounced weak points, as he sees them, and hence his flock will strongly reflect his fancy.

The old established flocks do not vary much in their make up from year to year. The same farm visited at the same season in different years will present about the same appearance so far as the flock is concerned. Ewes that reach a certain age are put into market condition and disposed of and carefully selected ewe lambs are called in to fill the breach. Haphazard methods find no place on the British sheep farm and definite uniform results are consequently looked for and in large measure realized.

Sheep raising undoubtedly finds its highest development on the farms where pure-bred flocks are reared. Most, if not all of these, are commercial flocks, that is to say, large numbers of sheep are annually fatted and sold to the butcher trade. Only the choice representatives carrying a maximum of breed type and excellence are maintained and perpetuated as pedigreed stock.

The pure-bred flocks of England run from two or three hundred up to one thousand head or more of ewes. This number in addition to quite an extensive stock

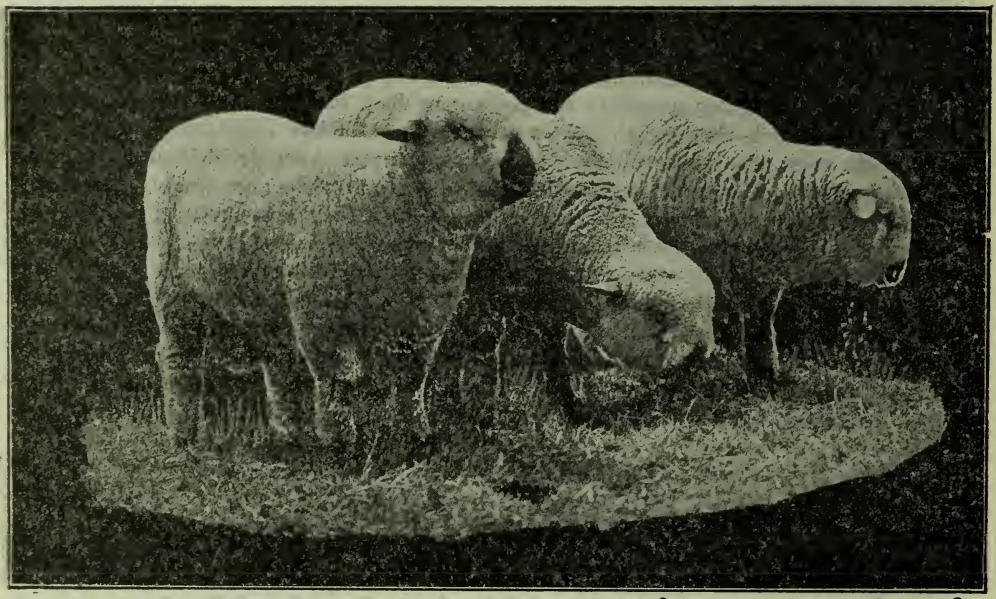
of cattle and horses is maintained on farms of 450 to 500 acres. The system of herding very commonly adopted, makes it possible to carry this heavy stock. Such crops as rye grass, orchard grass, red clover and sainfoin produce luxuriantly on the rich soil made so by years of intense sheep culture. Rape, roots, cabbage and the like are also grown for the sheep, and unless at such seasons of the year as rapid gains or development are desired the various branches of the flock are inclosed within the hurdles, receiving in addition to the generous forage a bite of oil cake or other strong ration. During the early summer and again after the lambs are weaned the matrons and perhaps the young ewes usually have their liberty on pasture but even here much travel is not necessary to secure a belly full. Feed seems abundant everywhere and it is kept so by frequent changes of run and judicious management in other ways.

After the lambs are weaned they are constantly confined to the hurdles, winter vetches, tall oat grass and clovers almost hiding the youngsters in their lot from that time onward. In addition they receive once or twice daily an allowance of crushed oats and oil cake. The hurdles are moved each day, leaving behind closely cropped ground and taking in an abundance to eat. On many farms the ewes that are pasturing on grass are given access to the plots gone over by the lambs eagerly picking off the stems which they relish by way of change. Their constant changing has much to do with the thrift so much in evidence in the average British flock. By taking advantage of this nothing is lost and the ground is again given opportunity to reclothe itself, to be again gone over in the course of a few weeks. To this end successions of crops are sown wherever opportunity offers. Mangels and turnips frequently follow a pasture crop and these come on to be fed off either where they stand in the field or are doled out day by day in troughs during the winter and spring and even well into the summer following. Mangels seem to be almost perpetually on hand on the English sheep farm. They are fed on pasture as well as on dry feed and are highly valued for the variation in the diet and their beneficial influence upon the digestive organization.

In the South of England.

In the south of England much land is devoted to sheep raising. In the Dorset section Dorset ewes are bred twice or three times to Dorset rams and once to a Down ram, after which they are fed to be sold, ewe, lamb and all for the block. In this way the breeding flock is kept pure, the ewes are turned off at an age to suit the market, and the half-Down lambs dropped in the early winter command the highest price of the year.

Here the sheep receive full consideration in the farming operations. The rotation is a short one, consisting of wheat, followed by grass and clover to be fed off by sheep. This may lie but one year, part of it being made into hay. Some vetches are grown to be fed green or as hay, and a considerable breadth of turnips being followed by wheat again. Here the sheep are hurdled on the land from which they carry away very little if any fertility. The key-note of the sheep husbandry here, as in other parts of England, is first the hurdle, then the newly sown field, and then the faithful shepherd. In Canada we lack the favourable winter so valuable to the British sheep keeper, but all other conditions are favourable for the highest development of the sheep industry. Perhaps what would be hardest to get is the faithful trained shepherd, who lives for his care and is always looking for the most promising ewe lambs to replenish the flock.



Thrifty English Lambs.

Mutton Making in Scotland.

Commercial mutton raising is a highly developed industry in parts of Scotland. Some sheep farms carry only what is known as a 'flying stock'—that is to say the sheep whether bred on the place or bought in are kept upon the farm for only one year or less. On other farms stocks of ewes of regular ages are maintained. Where the former practice is in vogue, ewes that have raised three crops of lambs are bought in September, and with their lambs are sold fat the next spring or early summer. By many, half-bred (Leicester-Cheviot or Leicester-Blackfaced) ewes are preferred, but Oxford Downs and Suffolks are also purchased to turn off. Pure-bred Leicester and Oxford rams are generally employed on these ewes. In the autumn lambs also are bought in to consume what turnips and grass there may be available and to be marketed when fat in the winter or spring. The practice described is especially adaptable to rich land on which a short crop rotation is the rule. Here the grass land lies only one year, or two at most.

On higher lying or poorer farms which maintain a considerable area of old grass pasture, flocks are maintained throughout the year and from year to year. As a rule the ewes are half-breds of the same crosses as already mentioned. These are mated with pure-bred Leicester or pure-bred Oxford rams, or in some cases Hampshires, Suffolks or Shropshires. It is the practice of many to divide the flock into two divisions about equal in number. On the old pasture the half consists of one-third bought-in shearlings to have their first crop of lambs, one-third two-year olds and one-third a year older to have their third crop of lambs. The progeny of this half of the sheep stock is mostly kept on for feeding for the market on turnips.

The second half of the ewe stock is made up of first, three-crop ewes that have been transfered from the first to the second half of the stock, in which they form about one-third of the necessary number; and second, double this proportion of ewes of the same age bought in from farmers who dispose of their ewes after their third crop of lambs. The old ewes are bred early in the fall so as to have their fourth crop of lambs ready for the fat market, to which both ewes and lambs are sent.

The feed grown upon the farm consists of grass and turnips. Great care is exercised in seeding to grass. For a single season's pasture a mixture composed of 12 pounds of Italian rye grass, 14 pounds of timothy and 10 pounds of red clover is sown per acre. When seeding for a longer period a favourite mixture is 12 pounds Italian rye grass, 6 pounds perennial rye grass, 14 pounds timothy, 4 pounds red clover, 4 pounds alsike, 3 pounds white and 2 pounds trefoil or yellow clover. This seems a heavy seeding, but the Scottish farmer finds such a seeding pays in mutton. It enables a heavy stock to be carried on the land and the variety provided ensures rapid gain of the sheep and lambs.

The turnip crop is of great importance. For the fall months the white variety known as Greystone is used. When this is eaten off a later sort of green top white comes into use, and by the new year the swedes may be turned upon or fed by hand. To use swedes early is found to be injurious to the lambs, proving even fatal at times.

Flocks Renewed Each Season.

In seasons of good grass about two ewes per acre are purchased in September. These are kept upon grass until bred. A supply of turnips is hauled to the field for a short time before the mating season, which commences about the middle of September, to build them up. It is believed that ewes produce more twins when thriving well at mating time. From 40 to 50 ewes are allowed to each ram.

After the mating time as the winter advances hand feeding is necessary. Turnips are supplied in moderate quantity, about 1,400 pounds being given to 100 ewes.

They also receive cotton cake up to a pound each. Near lambing time about a quarter of a pound per head of a mixture of bran and oats is given. In frosty weather the supply of turnips is reduced and hay is liberally fed.

As lambing time approaches the most forward ewes are drawn out to be enclosed in small groups to avoid crowding, and as these are able to leave for the open field others are brought in to take their place.

When the lambs are able to look after themselves they are turned with their mothers into pastures, where hurdles laced with straw are erected for shelter. The most forward lambs are selected for the earliest and best young grass pasture in order to be rushed along to catch the high prices early in the season. All are brought along as rapidly as possible, and disposed of as they are ready.

The treatment of store lambs bought in is interesting. The sales of these commence about the end of July and continue into the autumn. Care is taken not to over-stock, as rapid gains are desired. These are placed in good pasture, and grain feeding is commenced. Oats, bran and cotton cake or oil cake are fed in very moderate quantities at first and gradually increased at the discretion of the shepherd. Large flocks together are avoided, the numbers not exceeding one hundred head. The lots are made up according to size and condition, and disposed of one lot after another as they become fit for market without disturbing the others.

The space given each lot depends upon the length of the field to be fed off and the number of lots; the breadth of each division is usually about fifty yards—the length of hurdle nets employed. In the district referred to wire nets are used for the side divisions and string nets in front, whereas in many parts of England wooden hurdles woven from wands are used.

The amount of attention devoted to the fattening lambs would astonish many Canadian sheep raisers. Every inducement is given the sheep to consume as many turnips as possible, as rapid gains are desired in order to get the stock off to market with the least possible delay. Baskets are filled in the evening to be ready for early feeding in the morning. As early in the morning as light will allow, the shepherd feeds in separate boxes as much cotton cake as will be eaten up clean in an hour. At the same time the turnips prepared the previous evening are fed in the proper troughs. Only a few are given the first round in order to get all the lots busy at the troughs. The feeder then comes back to the first lot and leaves as many cut turnips as will cover the bottom of the troughs two or three inches deep, and continues to serve all the lots in the same manner again and again during the whole day. By this system of frequently supplying freshly cut roots, the sheep are induced to partake of more food. At three o'clock in the afternoon a supply of cotton cake is given as in the early morning and in the evening the turnip troughs are filled for the night. A rack of hay is placed in each inclosure and is replenished every afternoon. This daily routine is continued until the sheep are sent fat to the market.

FATTENING SHEEP IN CANADA

While a very large percentage of sheep and lambs that are marketed direct from the farms go right off the pasture with no special preparation in the way of fattening, many progressive and thorough sheep raisers fatten their stock as they do their beef cattle and hogs in order to secure the best prices for their product. A finished article is always in demand at a valuation in advance of that sold in leaner condition.

A finished mutton sheep, like the finished bacon hog, is not the heavy over fat animal that was looked for many years ago. Consumers are more delicate in their taste and discriminating in their choice than in the past, and therefore want their mutton or lamb lean, tender and juicy. While this is true, a thin, lean carcass is not a desirable article of diet and therefore should not be sent off the farm unless to be fed in some other man's feed lot until ready for the purpose for which mutton sheep are grown.

Owing to limited supplies of sheep in every province of the Dominion even the lean, skinny specimens will sell, although of course at a lower price per pound than those which kill out plump carcasses. If bred from low-set well-bred stock and well fed and cared for until the autumn both lambs and older sheep are usually about as fat as the market demands. On account of the natural tenderness of the lambs all the flesh they carry is juicy and well flavoured. If, however, the market is overstocked and it is desired to hold over until the price has improved, the stock should be put on a fattening diet until finished. The market is usually very good from the middle of February onward, and the stock should be ready to top the market by the time one chooses to sell.

After the lambs are weaned the wethers, and others to be fattened, should have access to a variety of pasture. An old grass field is very useful by way of a change, but an additional plot of aftermath clover, lucerne or rape or a combination of these will supply an excellent bill of fare. A feed in the morning of oats and bran is not lost on fattening lambs—it will increase the gains and reduce the risks of illness from an over succulent diet. The salt supply should never be allowed to run out at this season particularly when the white frosts appear. An over-feed of salt is dangerous on a succulent diet. Rather than give salt irregularly in the autumn it is safer to withhold it altogether at this season. Indeed many are adopting this latter plan. No drinking water is needed by sheep pasturing on rape or lucerne. Autumn is the natural season for all animals to flesh up, and every advantage should be taken to aid the process. With the advent of frosty nights care must be taken not only to hold the weight made, but to continue the increase as rapidly as possible. The appetites are keen and unless flesh is being deposited each and every day the food that is eaten is lost to the owner. To guard against any check it is well to furnish a morning feed of well saved clover. The animals will relish it and begin to thrive anew. It is the practice of many cautious feeders, anxious to keep down the mortality to a minimum, to bring up the flock to a grass plot in the evening and have a feed of hay ready when they arrive, or in a separate yard to be turned into the first thing in the morning. It is not a bad practice to provide a feed of grain in the evening and the hay or both in the morning before turning out for the day. Lambs cared for in this way will put on weight very rapidly. It is remarkable how many sheep can be fattened on a comparatively small area of land sown to the proper crops.

Winter Fattening.

The principle of avoiding extreme changes of diet observed by all careful feeders, should be strictly adhered to when the housing season arrives. The daily feeds of hay and grain, for a few weeks before winter seals up the ground and renders pasturing unprofitable, is a fine preparation for complete hand feeding. As the rape, lucerne or whatever outside crop has been the chief diet fails, roots may be gradually substituted. The hay will have to be increased to all that the lambs will clean up twice or three times daily and the grain ration may be gradually augmented as well. The chief thing to aim at is to keep the feeders gaining and thus paying for their diet as they go along.

The selection of a grain ration is a matter depending upon the market and the crops grown at home. It is generally wise to avoid purchasing feed if it can be satisfactorily raised on the farm. In planning the sowing of the different fields of the farm in spring the fattening lambs should be provided for as far as is consistent with the suitability of the soil and other conditions.

Oats are peculiarly suited to sheep feeding. This grain is nourishing and safe to feed. Two parts oats, one part peas and one part bran is a good ration for sheep of any class. Corn substituted for the peas answers well. Towards the end of the finishing period the heavy part of the ration may be increased to fully three-quarters by weight. Oil cake is highly valued by many sheep feeders. It may be substituted for the bran, when the proportion of heavy grain should accordingly be diminished. From half a pound to one and one-half pounds of grain per head per day according to the ends to be attained constitutes a fattening ration, when the coarse fodder used is fed liberally and of good quality.

It is of the first importance that for the well-doing of any class of live stock the animals be comfortable. Unless proper precautions are taken sheep are almost sure to be more or less infested with ticks, and perhaps the more minute form of vermin—lice—a more irritating insect than the former. To rid sheep of these pests they should be thoroughly dipped with one or other of the reliable commercial preparations, which not only destroy the vermin but clean the skin, reducing irritation and unrest to a minimum.

Feed to a Finish.

Market sheep should not be sold until finished nor should they be fed for a longer period. If a portion of the flock is behind the others in this respect and it is desired to ship out the entire flock at once the leaner ones should be separated out and pushed along more rapidly. One requires some training to be able to judge when a sheep is finished. In well-bred sheep the back is a safe guide, but inferior ones may be bare on the back and still be fairly fat. To examine a sheep for fatness the hand should be laid firmly on the back, palm downwards, and moved from side to side. In a finished sheep the spine is well covered, presenting a cushiony, rubbery feel. In addition the tail and breast should be examined. In a finished sheep the tail carries considerable plumpness, while an examination of the brisket shows fulness on either side, filling the space between that and the leg. An over-fat sheep carries a considerable depth of fat low down on the fore ribs and a sagging condition on each side of the brisket. The market does not want extremely fat sheep. Fig. 41 shows a cross-section of a highly finished sheep, Fig. 39 shows a carcass much too fat for the trade, while Fig. 40 shows a condition of fatness suitable for the average consumer. Very many sheep are sold in a much thinner condition. Fig. 38 shows a group of finished ewes selected on Toronto market by experienced butchers. These ewes weigh from 140 to 155 pounds each.

Fig. 38—Group of Finished Ewes.

Fig. 39—Cross Section of a Carcass much too fat.

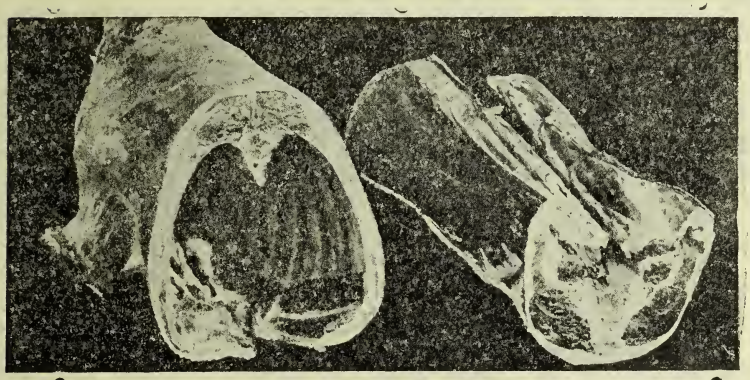


Fig. 40—Cross Section of a Carcass fat enough for the average trade.

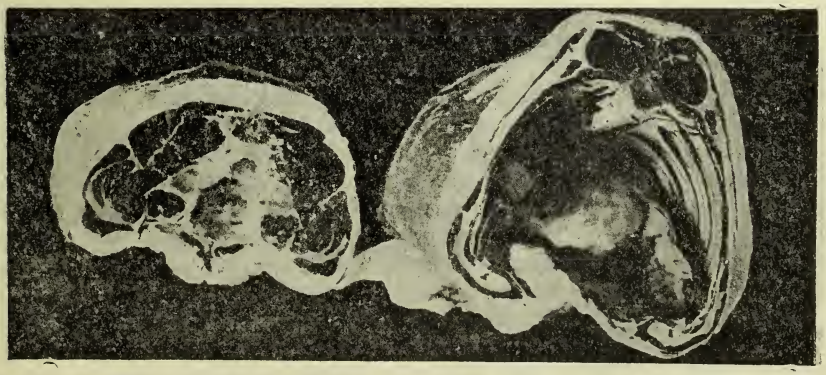


Fig. 41—Cross Sections of a highly Finished Carcass.

Spring Market Good.

The practice of selling off the great bulk of lambs in the autumn leaves the market very bare of freshly killed young sheep during the later winter and spring months. The chief source of mutton supply at that season is the frozen carcasses that were stored away at the beginning of the winter. Such meat is not the sort to satisfy a high-class trade, so that the price of good yearling mutton is always at a premium at that season.

Fattening on Screenings.

During a number of years sheep and lamb feeding was carried on quite extensively at grain shipping centres in Canada. At Moosejaw, Sask., Port Arthur, Ont., and other points, sheep fattening became an important industry. At these places very large quantities of elevator screenings, consisting of broken and small wheat, weed seeds and short pieces of straw, are cleaned out of the wheat prior to reshipping. The value of this material as food for fattening sheep and lambs is very high, producing rapid gains in weight and mutton of excellent quality.

The feeding period lasted about one hundred days, when the lambs were turned off without their fleeces weighing from 90 to nearly 100 pounds each. They were marketed chiefly at Winnipeg and Toronto at top market prices.

The sheep were inclosed in open yards surrounded by sheds with only back and roof. In the yards were racks for hay and large roofed self-feeding hoppers kept constantly supplied with screenings. The lambs were shorn in March, after which they made very rapid gains until sold.

FROM THE BLOCK TO THE TABLE

While mutton is one of the most healthful of meat foods produced upon the farm, it is not as popular as beef or pork with the average Canadian family. In Britain and other countries where sheep of the mutton breeds are intelligently reared and fattened, and the meat properly prepared, this class of flesh holds it place with the other staple sorts that enter into the daily consumption of the people. In countries where wool production is the chief consideration of the sheep raiser, mutton is not a desirable food, because the quality of the flesh is of low order, lacking in desirable flavour and texture. It is only in recent years that mutton joints have won a place on the bills of fare of the best restaurants in United States cities. Until the American sheep grower introduced the mutton breeds and finished the product of his flocks as he did his cattle and his hogs before marketing, mutton was an unpopular food in the United States. Mutton may be palatable and nourishing or, on the other hand, a tough, woolly-tasting product, according to the method of its production and preparation. No other class of meat is so subject to improvement as mutton. In recent years the general marketing of sheep before one-year old has increased mutton consumption in Canada many fold. This is more particularly true in towns and cities that have the advantage of discriminating markets and well conducted abattoirs. Butchers that secure their stock of mutton from these sources are able to offer their customers mutton of a quality that appeals to a refined and discriminating taste.

The development of the industry from the standpoint of the consuming trade in so far as it comes into contact with the influence of the modern abattoir and trained butcher, is making satisfactory progress. This is indicated by the improving prices paid for finished mutton. It is on the farm—the source of the mutton supply—that the consumption of this nutritious, healthful product stands in need of development. No other class of animal so readily lends itself to the demands of a rural household for a supply of fresh meat as a young sheep. It is of the highest importance that it be in good killing condition and that the butchering and curing be promptly and properly executed.

The Butcher's Animal.

First-class meat cannot be obtained from animals that are poor in flesh. A reasonable amount of fat must be present to give juciness and flavour to the flesh, and the fatter an animal is, within reasonable limits, the better will be the meat. 'Never kill an animal that is losing flesh,' is a maxim followed by butchers, and observation points a logical reason for the saying. With an animal failing in flesh the muscle fibres are shrinking in volume, and contain correspondingly less water. As a consequence the meat is tougher and dryer. When an animal is gaining in flesh the opposite condition obtains, and a better quality of meat is the result. Also a better product will be obtained from an animal in only medium flesh, but gaining rapidly, than from a very fat animal that is at a standstill or losing in flesh.

Quality in meat is largely dependent on the health and condition of the animals slaughtered, and yet the best quality of meat is rarely, if ever, obtained from poorly-bred stock. The desired 'marbling,' or admixture of fat and lean, is never of the best in scrub stock, nor does the highly fitted show animal furnish the ideal in a carcass of meat. Their seems to be a connection between a smooth, even, and deeply fleshed animal and nicely marbled meat that is not easily explained.

Age affects the flavour and texture of the meat to quite an extent. While it is not possible to state the age at which an animal will be best for meat, it is a well-

known fact that meat from old animals is more likely to be tough than that from young ones. The flesh of very young animals frequently lacks flavour, and is watery. An old animal properly fattened and in good health would be preferable to a young one in poor condition.

Preparation for Killing.

It is important that sheep intended for slaughter should be kept off feed from twenty-four to thirty-six hours. If kept on full feed the system is gorged and the blood loaded with assimilated nutriments which are driven to the extremities of the capillaries. In such a condition it is impossible to thoroughly drain out the veins when the animal is bled, and a reddish coloured, unattractive carcass will be the result. Food in the stomach decomposes very rapidly after slaughter, and when the dressing is slow the gases generated often flavour the meat. This is frequently the source of the 'woolly' flavour in mutton to which most people express a pronounced dislike. Water should be given freely up to the time of slaughter, as it keeps the temperature normal and helps to wash the effete matter out of the system, resulting in a nicely coloured and good-flavoured carcass.

The care of animals previous to slaughter has considerable effect on the keeping qualities of the meat. It is highly important that they be not excited in any way sufficiently to raise the temperature of the body. Excitement prevents proper drainage of blood vessels, and may cause souring of the meat very soon after dressing. In no instance should an animal be killed immediately after a long drive or after a rapid run about the pasture. If heated by such cause it is far better to allow it to rest overnight before killing than to risk the meat spoiling. It is also essential that the animal be carefully handled so as not to bruise the body. Bruises cause blood to settle in that portion of the body affected, presenting an uninviting appearance, and often causing the loss of a considerable portion of the carcass. A thirty-six hour fast, plenty of water, careful handling, and rest before slaughtering are all important in securing meat in the best condition for use, either fresh or for curing purposes.

Only simple butchering appliances are necessary. A proper sticking knife, a skinning knife, a small hoisting pulley, a supply of skewers and a small number of home-made brackets and gambrel sticks complete the outfit for farm sheep killing.

Avoiding the Woolly Flavour.

As already indicated, much of the sheepy flavour of mutton comes from the generation of gases in the stomach after the sheep is killed. For this reason, in addition to proper fasting, it should be dressed as rapidly as possible. A platform 6 or 8 inches high is convenient to work on, and aids in keeping the carcass clean. A clean, dry place is necessary for neat work. Water or blood on the wool makes it very difficult to dress the animal nicely.

If the sheep is an old one, it may be stunned before bleeding. If a young one, the same purpose is served by dislocating the neck after cutting the throat. This is accomplished by putting one hand on the top of the head and the other hand under the chin, giving a short twist upward. Lay the sheep on its side on the platform, with its head hanging over the end. Grasp the chin in the left hand and stick a knife through the neck just back of the jaw. The cutting edge of the knife should be turned toward the spinal column and the flesh cut to the bone. In this way it is possible to avoid cutting the windpipe.

Skinning and Dressing.

In skinning, split the skin up the back of the front legs from the dew claws to a little above the knees. Open the skin over the windpipe from brisket to chin, starting it slightly on the sides of the neck. Split the skin over the back of the hind legs to the middle line and skin the buttock. The skin should also be raised over the cod and flanks. Skin around the hocks and down to the hoofs, cutting off the hind feet at the fetlock joints. Run the knife between the cords and bone on the back of the shins, and tie the legs together just above the hock until after the carcass is hung up. Hang the sheep up by the hind legs and split the skin along the under middle line. Start at the brisket to 'fist off' the skin. This is done by grasping the edge of the pelt firmly in one hand, pulling it up tightly and working the other with fist closed between the pelt and the body. The 'fisting off' should be downward over the fore-quarters and upward and backward over the hind-quarters and legs. It is unwise to pull down on the skin over the hind legs, as the membrane covering the flesh is sure to be ruptured and an unsightly appearance given to the carcass. The wool should always be held away from the flesh for the sake of cleanliness. The skin on the legs should be pulled away from the body rather than towards it, in order to preserve the covering of the meat. When the pelt has been loosened over the sides and back it should be stripped down over the neck and cut off close to the ears. The head may then be removed without being skinned by cutting through the neck joint.

Begin removing the entrails by cutting around the rectum and allowing it to drop down inside. Do not split the pelvis. Open down the belly line from the cod to the breast bone and take out the paunch and intestines, leaving the liver attached to the carcass. If the mutton is for home use split the breast bone and remove the heart, lungs and diaphragm together. Reach up into the pelvis and pull out the bladder. Wipe all blood and dirt from the carcass with a coarse cloth wrung nearly dry from hot water. Double up the front legs and slip the little cord, found by cutting into the fleshy part of the forearm, over the ankle joints.

Cooling and Cutting.

It is very important that the carcass be cooled soon after slaughtering, and yet that it be not allowed to freeze. The most desirable temperature for cooling meat is 34 deg. to 40 deg., and an approach to these temperatures will give good results.

In the summer season it is best to dress the animal in the evening, leaving the carcass in the open air over night and carrying it to a cool, dark cellar before the flies are out in the morning. Very often a cool room in the barn can be used for the purpose if made dark. There should be no fresh paint, tar, kerosene, or the like substance around, however, as freshly killed meat absorbs such flavours readily. Cooling is often hastened by splitting the carcass into halves or even into smaller pieces. It is best, however, not to divide the carcass until the meat is firmly set unless absolutely necessary to prevent it from souring. For the best results in cooling meat, the air should be dry, as well as cool, and free circulation aids greatly in carrying away foul odors and mould spores. It is also important that flies and insects be kept away from the meat.

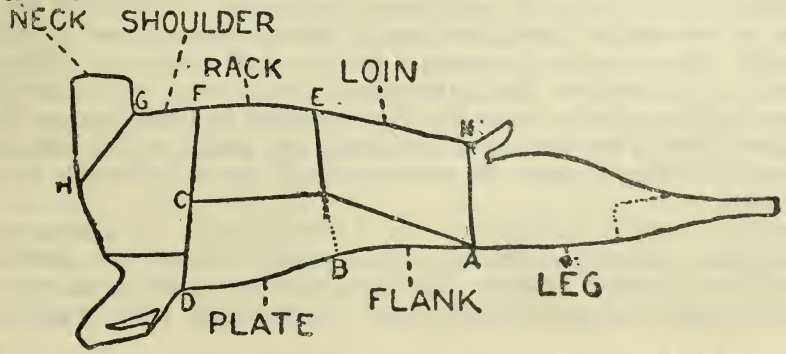


Fig. 42.—Diagram showing Method of Cutting up a Carcass of Mutton.

To do neat work in cutting up meat one should have a short curved knife (a skinning knife is as good as any), a meat saw, and an 8-inch cleaver. An axe may take the place of the cleaver, but is not nearly so useful. If a cross section of a large log can be had it will answer for a block. A table, however, can be used in most cases.

In cutting one should always cut across the grain of the meat. Following this principle will result in uniform pieces and the joints will be more easily carved after cooking. Cut to the bone with the knife, and use a saw rather than an axe for cutting the bone.

First split the carcass into halves. then cut off the flank and breast, following the line A, B, C, D, in Fig. 42. Cut off the leg at the top of the round, A to K, just touching the hip joint. Remove the shanks below the fleshy part of the leg. Cut off the shoulder between the third and fourth ribs and the neck at the shoulder vein. Remove the front shank at the elbow joint. When a 'saddle of mutton' is wanted, one must deviate from this method of cutting and cut the saddle in one piece before the carcass is split in halves. The leg of mutton is sometimes cut into steak, but is usually roasted whole or boiled. The loin may be used for chops, the slices being cut parallel to the ribs, or it may be roasted if desired. The chops should be cut 'one rib' thick. If used as an oven roast joints in the backbone should be cracked with a cleaver to admit of easy carving at the table. The rack is used in the same way as the loin. The joints in the back of the shoulder should be cracked and the ribs broken across the middle on the inside, when it may be used as an oven roast from a young mutton, or as a boiling piece if from an old one. The breast and flank, when trimmed, are used for stews; the neck and shank for soup stock.

Keeping the Meat.

Cold storage mutton used while fresh is more nutritious and palatable than salted or cured meats. It is therefore desirable to use as much of it uncured as possible. It is very difficult to keep meat fresh during the summer months without the use of ice, and even then little can be handled at one time on the ordinary farm. Where a room or family refrigerator can be kept at a temperature of 40 deg. or less, with good ventilation and circulation of air, fresh meat can be kept for ten days or longer. It is very important that the circulation be free and the air dry. Moisture in a refrigerator tends to develop wet mould or slime, and a little decay soon contaminates the whole piece. Less difficulty will be experienced in keeping fresh meat if it is kept in a room where the temperature is relatively high and the air dry than where the temperature is low and the air damp.

Where an ice house is filled each year a small portion of it may be partitioned as a cold-storage room. With the ice properly packed on three sides of it, and with good drainage, this makes a very satisfactory place for keeping meat, and it may also be used for storing butter and other perishable products.

Mutton is kept during the cold season by freezing. A carcass is cut up into quarters, or even smaller pieces, and hung in an outbuilding, where it will remain frozen solid. When a portion is wanted it may be cut off with a saw. If the meat is taken into a cold room and slowly thawed out the flavour is only slightly injured. No more should be taken in at one time than is wanted for immediate use. Repeated freezing and thawing are injurious to the flavour and quality of the meat, hence the importance of keeping it where the temperature will remain sufficiently low to prevent thawing.

Packing in snow is a satisfactory way of keeping meat. The carcass should be cut into chops, roasts and boiling meat. All trimming for table use should be done before allowing the meat to freeze. Lay each piece out to freeze separately, where it will not come in contact with other meat. Secure a box large enough to hold it

all, and put a layer of dry snow at the bottom. When the meat is frozen put in a layer, packing it so that no two pieces touch. Cover this with a layer of snow and lay alternate layers of snow and meat until the box is filled. Set the box in an outside shed where it will not be subject to sudden changes of temperature. For convenience in getting the meat when wanted, it is well to pack chops in one section or end of the box and the roasts and stews in another. It will not then be necessary to disturb anything but the piece desired when a supply is needed. Use only dry snow in packing; be sure the meat is frozen solid, and it can then be kept through the winter unless there is a very mild spell.

Maturing and Curing.

Lamb does not improve by keeping after the carcass has become thoroughly cool and firm. It requires no maturing to give tenderness, and long keeping tends to lose the delicate 'lamb' flavour. Mutton, on the other hand, to be in best condition should be 'matured on hooks' for a few days to a week or longer according to the available temperature. Well hung mutton is more tender and of better flavour than when it is eaten freshly killed. It is probably at its best at the end of from ten to fifteen days' storage in a dry atmosphere at a temperature of 40 to 45 degrees.

Without access to a satisfactory cold storage it is necessary to cure parts of the carcass in order to avoid loss or monotony of diet. Corned mutton is very good, and mutton hams are delicious.

No kind of meat should be cooked before the animal heat has all passed off and the flesh has become firm. A failure to recognize this requirement is responsible for much of the dislike for mutton in rural districts. Years ago, before the days of the 'beef ring' and the peddling butcher, when every farm had its quota of sheep, the preparation for any sort of bee, such as sawing or threshing, included the killing of a sheep for the midday meal. The forehanded host usually fasted his subject, and did his butchering the evening before, but too often the former was entirely neglected and the latter overlooked until the morning of the busy day. The writer has witnessed the head of the farm, with the aid of a boy, pursuing the victim, knife in hand, at nine in the morning of the day the mutton was to be eaten. Was mutton a popular meat with the threshing gangs on those days? Before the end of the season many an innocent sheep was slyly stoned or dogged by a threshing hand, who until this day thinks of mutton only with disgust.

Corning Mutton

Mutton may be successfully corned by a number of methods. Mutton may be kept sweet several weeks by simply rubbing well with dry salt and closely covering. The pieces should be turned whenever the vessel is uncovered. Following are three reliable receipts for corning mutton by the use of pickle:—

1. Make a brine strong enough with salt to carry a potato about half out. To half a barrel of brine add one-half pound of saltpetre. In ten to twelve days the curing will be complete. When cured it may be kept in a clean new weak brine.

2. To every 4 gallons of water allow 2 pounds of brown sugar and 6 pounds salt; boil about twenty minutes, taking off the scum; the next day pour it on the meat packed in the pickling tub; pour off the brine, boil and skim every two months, adding 3 ounces brown cane sugar and ½ pound common salt. Sprinkle the meat with salt before turning the pickle over it. Let it entirely cover the meat; add 4 ounces saltpetre.

3. Prepare a brine by adding to each gallon of cold water one quart of rock salt, one ounce saltpetre and four ounces brown sugar. As long as the salt remains undissolved the meat will be sweet. If scum rises, scald the liquid and skim well,

adding more salt, saltpetre and sugar. Each piece of mutton should be well rubbed with salt before being placed in the brine. If the weather is hot the meat should be gashed to the bone and salt rubbed in. The meat should be kept immersed in the pickle by means of a weight. A canvas lid kept on the vessel is commendable, as it admits air and excludes flies.

Spiced Mutton Hams.

Mutton hams are easily cured. As mutton takes salt very readily care must be taken not to get the hams over-salt. Select the leg of mutton, and cut off the leg at the hock. Some prefer to remove the entire bone. The curing treatment is as follows:—

Sprinkle and rub in a teaspoonful of saltpetre; rub on two teaspoonfuls equal parts ground allspice and cloves; then rub on brown sugar, about a teacup, then apply salt. Turn and rub with application every second day for three or four weeks. Meat thus cured is delicious boiled or sliced and fried.

HANDLING SHEEP

It is remarkable how few sheep raisers understand how to properly catch and handle their stock. The old shepherd's crook, so humane and useful in the years that are past, is no longer to be seen on more than a very few Canadian sheep farms. In many British flocks the crook still has its place, and with this and the intelligent dog the sheep are driven, caught and handled with comfort and facility for both man and beast.

To the sheep man it is painful to witness the rough, even brutal usage accorded the gentle, timid sheep on many mutton-raising farms. Apart from the pure-bred flocks, which are waited upon and cared for with the same gentle consideration as the family horse and the favourite cow, many of the sheep flocks are rushed and driven, grabbed and dragged in the most inhuman way. When the flock is to be divided or an individual separated from the others the bunch is usually rushed into a corner and the victims, one by one, grabbed by the wool and hauled struggling and kicking to the point of exit. To many sheep raisers and farm hands the wool appears to be a natural handle. If the torture inflicted by catching a sheep by the wool could be appreciated doubtless many would seek a better method. The examination of a carcass of a newly killed sheep that has been lifted by its wool reveals an inflamed and congested area resembling the effects of a severe jam or bruise at every point over which the wool was pulled, due to the rupturing of the tiny blood vessels and creating a soreness that must of necessity cause a stagnation in gain if not an actual loss of weight. Apart from this, if the animal is immediately slaughtered the carcass is injured in a greater or less degree according to the roughness accorded the animal.

The proper method of catching a sheep is by the hind leg or the head. If in a close pen in which the sheep are closely crowded it is an easy matter to secure the selected animal by the head, holding it fast until the others have moved away, clearing an avenue by which it may be taken. In a larger pen or yard a sheep should be caught by the hind leg just above the hock or gambrel joint, as shown in Fig. 43. A properly made shepherd's crook is of great assistance in this. The hook (Fig. 46), which usually has a handle six or more feet long, can be extended forward without approaching the sheep sufficiently closely to cause it to plunge to make its escape. When caught by the hock joint it is drawn back until it is easily grasped by the neck. When a sheep is caught in this way the flock is not frightened, as is the case when one rushes in to grasp a member.

To convey a sheep after it is caught the shepherd should place his left hand beneath the lower jaw. If the animal plunges it may be gently grasped by the wool on the farther cheek. The right hand should grasp the side of the tail or the end of the stub. In this position a sheep will almost invariably walk forward at the will of the person in charge. A sheep handled in this way (Fig. 45) is neither injured nor frightened, and is conveyed in comparative comfort for itself and the shepherd.

Much cruelty is exercised in hauling sheep from place to place. More especially is this the case when being taken to market. Few except owners of pure-bred flocks have on their farms a properly equipped sheep wagon. The result is that when sheep have to be hauled their legs are probably tied and they are tumbled into a wagon or sleigh and jolted along to their destination. The discomfort and bruising thus effected is nothing short of severe, and quite unnecessary cruelty.

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, if necessary, may be laid on the top, forming a cover to the wagon. The writer for many years used a wagon rack about 14 feet long and as wide as a wagon

Fig. 43—Catching a Sheep
" 44—Throwing a Sheep
" 45—Leading a Sheep.

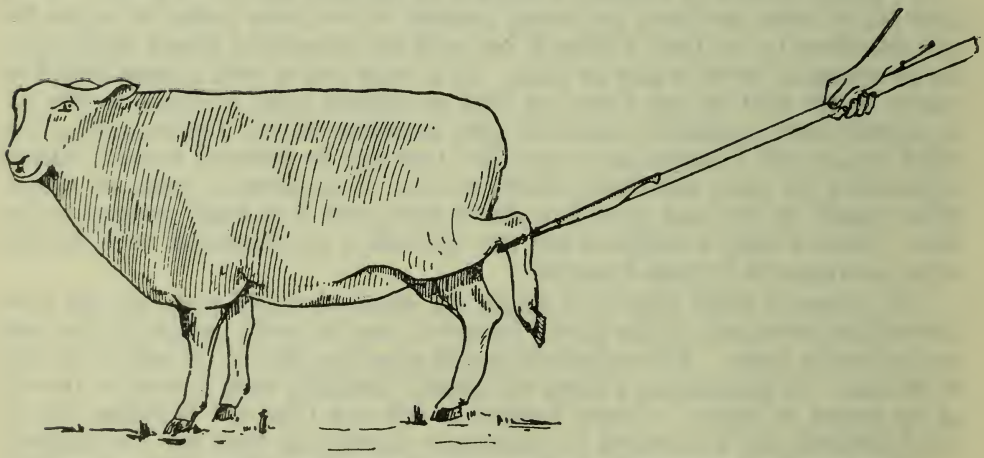


Fig. 45—Catching a Sheep with a Shepherd's Crook.

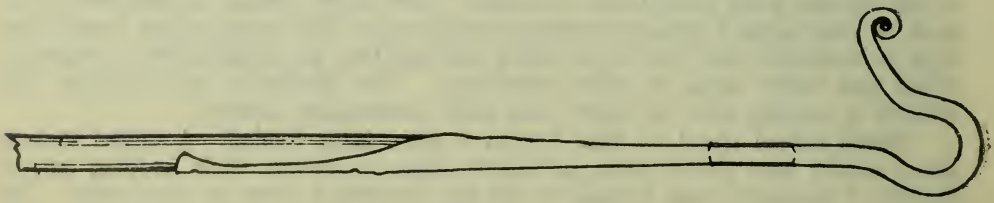


Fig. 46.—Shepherd's Crook.

box, the sides and ends of which were slatted and about three feet high. The end gates were fastened to the sides and the floor by rods—one at each corner of the wagon—passing from the top to the bottom and having threaded thumb nuts. The end pieces swung open forming convenient gates for loading and unloading. This rack was used upon the home and many neighbouring farms for hauling sheep and hogs and occasionally young cattle.

To load a sheep it is not necessary to lift it by the wool. Loading should be done by two persons, one on each side of the animal. The left hand of one is grasped by the right of the other beneath the chest of the sheep, preferably between the forelegs. The other pair of hands are similarly grasped beneath the flanks. In this position the sheep is easily raised and loaded without plunging or injury.

DIPPING

A sheep-raising farm that has not a properly arranged dipping tank or other means of treating the flock to fight skin parasites is not equipped as it should be for getting the most out of the industry. All sheep are liable to have ticks and lice and

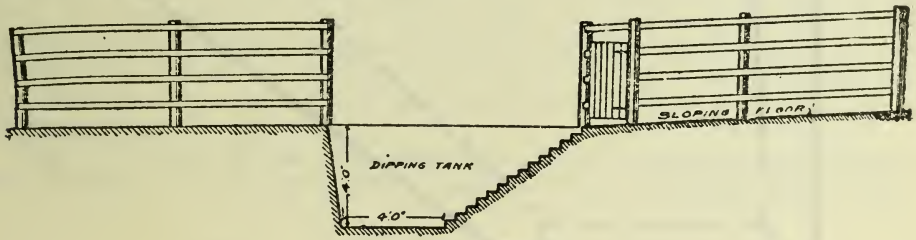


Fig. 47.—Cross section of dipping Tank and Pens.

there is also the risk of getting scab with every railway journey taken by the sheep or the introduction of fresh stock. One or two scab insects may easily spread the disease over a whole flock, causing no end of worry, trouble and financial loss. For this reason the dipping vat should be brought into requisition with every new arrival in addition to a thorough dipping of the whole flock, which should be done at least twice a year. This is a method of prevention that is worth much more than a remedy after the trouble has been introduced.

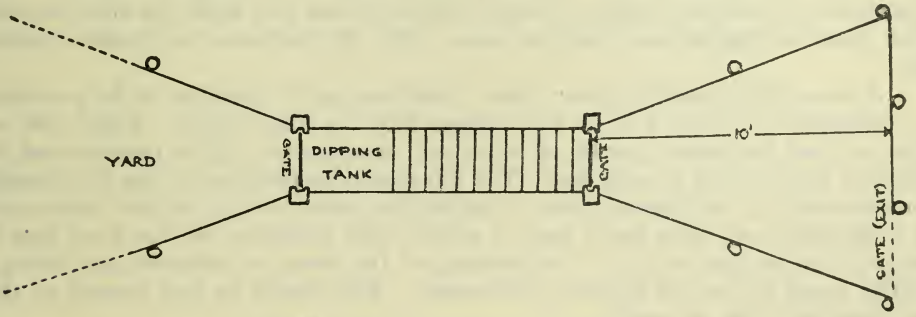


Fig. 48.—Plan of Dipping Plant.,

While comparatively few Canadian sheep breeders are familiar with scab there are practically none who could not identify the tick. The louse is a less well known insect, and being very inconspicuous it may cause much worry and loss of weight in the flock without being detected. Thorough dipping with a recognized insecticidal preparation is an easy and inexpensive method of destroying both of these pests and may also cure an incipient attack of scab.

The usual dipping vat is a simple form of trough of concrete, metal or wood, about 16 inches wide and 4 feet deep (see Fig. 49). With a tank of this description the sheep can be plunged so that no part will escape a wetting. They may be dropped or forced to leap into the liquid at one end and allowed to walk out at the other. The entrance end should therefore, be perpendicular and the other sloping with slatted floor. For a small flock the bottom level need not be more than four feet long, with the slatted incline beginning there and running gradually out to a draining platform from which the drip should be collected to be again used in the vat. To economize liquid the vat may narrow to eight inches at the bottom. The fleece will hold enough of the liquid, if of proper strength, to kill the lice and ticks, but if scab is present or feared the sheep should be immersed for fully two minutes, and the head

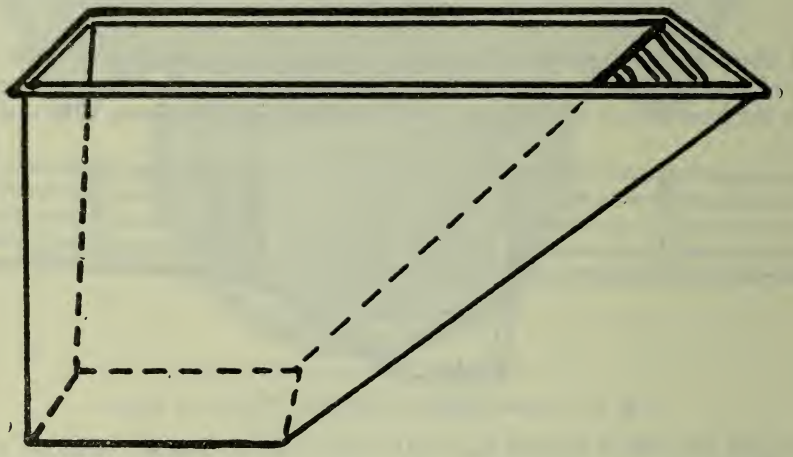


Fig. 49.—Outline of Metal Dipping Tank.

should be plunged two or three times. If time is less valuable than dip, comparatively speaking, it may pay to squeeze the liquid out of the fleece by hand upon the draining platform. Another plan of saving time and dip is to divide the draining platform into two pens, each to be alternately filled with the dipped animals. This arrangement allows the dripping sheep to remain in one pen while the other is being filled from the dipping tank and vice versa. Fig. 48 illustrates the divided draining pen.

A warm dip penetrates better than a cold one and is therefore to be preferred. A temperature of from 106 to 110 degrees Fahr. is about right. When coal tar dips are used soft water should be employed, or otherwise a little concentrated lye added to give the dip a soapy feel. The dip should be prepared to the full strength recommended by the manufacturer. For heating water for dip an open kettle such as is usually found upon every farm is useful. For reheating red hot irons may be thrown into the tank of dip. The plunging of the sheep is facilitated by having a sloping board just at the entrance of the tank. This should be kept greased so that the sheep will slide in readily.

While dipping may be done at any season it should, if possible, be avoided in very cold weather for obvious reasons. If it has to be done in winter the sheep should be comfortably housed until quite dry. The most favourable time for the chief bath of the year is a week or so after shearing time. The ticks will have largely taken refuge in the lambs, and all should go through the tub. At this time comparatively little material is needed. It is well to retain the clipped members in the liquid a minute or more, as the wool is too short to hold the dip long enough

to make a sure job of all the insects. It is important to repeat the dipping in ten days in order to destroy the new arrivals that have hatched during the interval. The flock should again be treated in the fall so as to go into the winter free and unmolested by parasites.

For a small flock a simple trough may be made to answer. The writer has dipped and treated hundreds of sheep, big and little, in an ordinary wooden trough 5 feet 6 inches long, about 20 inches deep,20 inches wide at the bottom and 24 at the top. Lambs were held by the legs and head and plunged beneath the liquid, back downwards, lifted out and allowed to drain. Larger sheep were treated on a platform by parting the fleece at intervals of about two inches and pouring the dip from a spouted vessel. The lower parts, including the breast, neck and belly should be treated first with the animal resting on its side or rump. The sides and back are then done with the sheep in a standing position. This method of dipping is slow and laborious, but it may be employed in the absence of a proper dipping tank. The dipping tank used at the Central Experimental Farm, Ottawa, for dipping sheep and swine is 34 inches deep, 30 inches wide, 10 feet 2 inches long at the top and 6 feet 5 inches at the bottom, plenty large enough for the largest hog or sheep or even calves. It is constructed of two-inch pine plank, tongued and grooved, and held together by bolts running through the centre of the plank up and down the sides and across the bottom. In building a plank tank the grooves or seams should be moistened with hot tar or red lead, and special care should be taken to make the construction tight.

Figs. 47, 48 and 49 show cross-section and plan of a dipping taonk with necessary collecting yard and dipping pens, as well as a view of a suitable tank or vat.

THE GREAT NEGLECT

When asked 'What is the most prominent defect in the sheep-raising industry of Canada?' nine out of ten of the most extensive buyers for the trade will promptly answer, 'the neglect of farmers to castrate the ram lambs.'

Apart from the lambs raised on the ranches, fully seventy-five per cent of the males have been marketed as rams. Improvement in these figures is shown each year.

It is difficult to understand that an operation so easily performed, and which means so much to the sheep trade, and therefore to the sheep grower, should be so generally neglected. To neglect cattle and hogs is an oversight condemned wherever observed, but for some reason the emasculation of sheep is looked upon as a matter of no importance. And yet the dealers who meet the raisers on the one hand, and the consuming trade on the other, pronounce the custom as the chief defect of the mutton-raising industry.

Is it because the entire crop of lambs comes about the same season, rendering the surgical task too ponderous to be undertaken, or is it because of the fear of fatality, or again has the habit of neglect of this important duty become hopelessly established? The condition exists, and in the interest of the industry should be overcome.

In the autumn one has only to visit a flock of mixed sexes to see one of the chief evils. A general restlessness of the flock is observed, continuously day after day from morning till night. Not only do the males neglect proper feeding but the others are molested and bothered, until the rapid gain expected with good fodder and cool weather is made impossible. The rams not only fail to gain but actually lose flesh put on at an earlier period. Even though the males are kept separate from the others of the flock, the restlessness continues more or less with a corresponding unprofitable result. The condition depicted is familiar to many a sheep raiser, who year by year has witnessed the same state of affairs. He has become accustomed to the unrest that possesses the flock within his fields each autumn, commencing with the advent of white frosts. Even in the summer he realizes what will happen later on, but he knows nothing of the peace and prosperity of the wether flock of his neighbour a few farms away. As the date upon which the buyer usually appears comes round, he watches eagerly for his visit, and as soon as the bargain is consummated he urges that his lambs be lifted with the first shipment. He knows that the rams will run down from that time on, and the sooner they are weighed out the earlier will peace reign in his flock. He has, however, opportunity of learning even more strikingly his disadvantage when shipping day arrives. His lambs go out on an average of perhaps 75 to 80 pounds, while his neighbours' wethers about the same age turn the scale at from 90 to 95 pounds each, for which he receives a better price per pound. To the evils attending the keeping about of a batch of fertile males already referred to, there is also the serious risk of a number of the best ewes, as well as lambs that should not be bred until a year later, getting in lamb to perhaps the meanest scrub in the flock.

Again, the keeping entire of the males renders it practically impossible to hold them over until winter or spring, when the prices are always better. They are largely responsible for the glutted condition of the market in the autumn months, and they have to be disposed of in the midst of the over-supply. To keep them even to December is expensive, because of the unsatisfactory gains they make, but apart from this by that date their flesh has become rank and therefore of inferior quality. According to the evidence of extensive dealers, fully fifty per cent of ewe lambs of the previous year marketed in February and March are with lamb. These men go

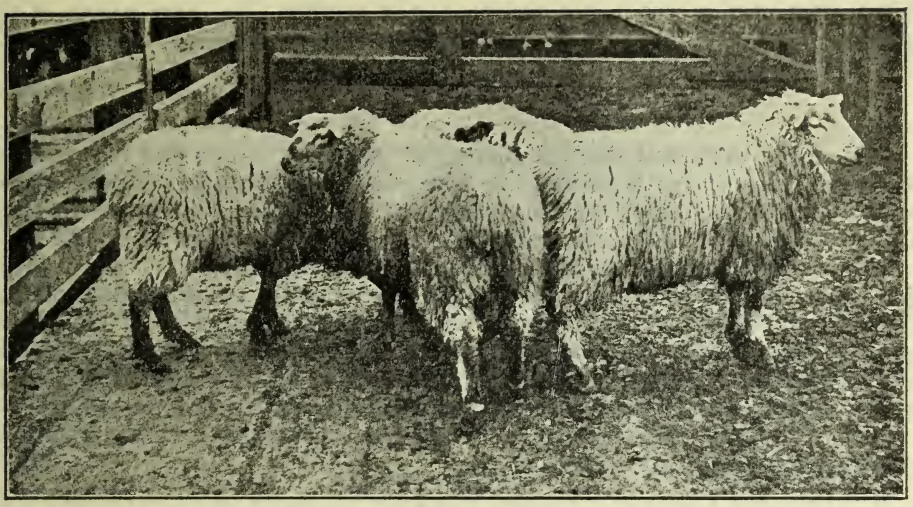


Fig. 50.—Ram Lambs, marketed as culls.

Fig. 51.—Wether Lambs, "Market Toppers."

so far as to assume that much of the mating is intentional with a view to securing slightly increased weight. However the condition comes about, the trade suffers from such bad management and the breeder is the loser. Buyers soon become familiar with the condition of stock from various districts and bid accordingly. Up to the early part of the fall season ram lambs sell upon about equal terms with ewes and wethers in most of the provinces of Canada, but in Ontario substantial price discrimination against ram lambs is commenced in July. In other provinces the reduction commences later and increases as the season advances.

Comparison on the Block.

It is on the block that the true comparison between the ram and the wether is made plain. The former is liable to be lean, lank and emaciated, differing widely from the plump, firm, meaty-backed wether that has devoted his energies to body-building regardless of his ignoble destiny, the shambles. (See Figs. 51 and 52.)

As the season proceeds the wether makes rapid growth, more particularly in the region of the loin and back, while the ram puts on weight in the neck and shoulders, falling away at the loin and hind quarters rendering him fit only for the poorest trade. To ascertain the comparative weights of ram and wether lambs of practically the same breeding and age, one dozen of each were weighed on November 1. The wethers weighed 1,020 pounds and the rams 900 pounds, an average reduction of 10 pounds per head. This, with a price sacrifice amounts to a pretty impressive penalty for the neglect of castration.

Is it right and proper that the ram lambs sell for nearly as much per pound as the wethers? The one is plump, juicy and highly palatable, while the other in large measure lacks these desirable qualities. The wonder is that greater discrimination is not made by every buyer, and undoubtedly it would be were it not for the keen competition for the stock. Unfortunately the good wethers help to pay for the mean rams, inasmuch as the law of averages is brought into operation by the buyers who must have lambs, and are able to get more by paying too much for the poor specimens in order to get the good ones. The dealers have thus a fine opportunity of teaching the important lesson that they say is so badly needed.

Methods of Castration.

The castration of a lamb is a simple operation, involving little risk if performed with ordinary care and due regard for cleanliness. It is important that it be performed when the lambs are quite young. About ten days old is a very favourable age, as then they are less likely to bleed, and the healing is rapidly effected. Perhaps the oldest, and by many considered a thoroughly satisfactory method, is to cut off the lower third of the scrotum with a sharp knife, sever the outer immediate covering of each testicle separately, and draw it out, cord and all, with the teeth. This method, however, is repulsive to many unaccustomed to it, and is not as commendable as some of the other ways.

The practice followed by the writer was to have the subject held by an attendant in a sitting position upon a bench with its feet outward. The operator sat astride of the bench upon the hind feet of the lamb. With a sharp knife, the bottom third of the scrotum was removed and each testicle skinned out and withdrawn one at a time by the fingers. If the lamb has reached one month. it is better to tie the cord about one inch above the testicle with a carbolized ligature, before severing the organ with a knife.

Another method is to sever the scrotum, with its contents, close up to the body. If the lamb is very young there is little or no risk involved. This may be done with a sharp knife or a pair of shears or scissors. A thoroughly antiseptic method and

one which prevents bleeding, is to use for severing the scrotum a pair of rather dull scissors, highly heated, so as to sear the wound as it is made. Especially for lambs that are more than three weeks old this method is recommended. It has the advantage of extreme simplicity.

The professional operator of the present day uses the lamb emasculator, an instrument much like a pair of scissors, having one blade notched, and neither very sharp. The testicles are pressed upward, the scrotum severed about half way up; the cords are thus exposed, and with one closure of the emasculator they are severed an inch or so above the testicle. The cords cut by this comparatively dull instrument do not bleed as freely as when a sharp edge is used.

By whatever system the emasculation is effected, the wound should be smeared with an antiseptic ointment, than which there is perhaps nothing better than carbolized oil, composed of one part carbolic acid to twenty parts sweet oil. The writer always used pinetar and lard in equal parts, and can confidently recommend its employment. It is very important that newly castrated lambs be given clean quarters. If the weather is cold, the pen should be thoroughly cleaned and bedded daily with fresh litter, but if the ground is warm, there is no safer place for the youngsters than a grass plot. It is clean and favourable to exercise—the latter an important consideration. In the course of a few days the lambs should be caught and examined, and any that show swelling or undue soreness should be bathed with warm water into which a few drops of carbolic acid or creolin have been added, and the wound anointed with carbolized oil or other antiseptic preparation.

The Tails.

In his earlier years, when in charge of a flock of high-class pure-bred sheep, the writer regarded the leaving of long tails as an evidence of poor shepherding and inferior stock. Perhaps the view taken was extreme, but later observation bears out the truth that the best sheep men everywhere dock their lambs as surely as they clip their ewes, while the poorest of them invariably neglect this operation. Perhaps a tail is no detriment, more particularly upon a male that is to be sold in the fall, but it looks bad to the sheep man and surely detracts from the blocky appearance of a sheep or lamb. Many who undertake to dock make a very poor job of the operation. A five or six inch tail looks about as bad as one not touched, but still one sees many half-tailed lambs. For best effect, a male lamb should be docked within one inch of the buttock, while a female should retain one or two more joints.

An ordinary chisel is a common docking instrument. The tail is held on a block and with mallet and chisel the operation is performed. A better way is to use a sharp knife with a fairly long blade. The lamb is held with its back firmly against the breast of the attendant, who grabs the tail close to the body, drawing the skin back firmly. The operator with his thumb nail finds the joint, which is larger than the bones between. With a firm slash he detaches the tail, and if the joint has been struck, the shock as well as the bleeding are less severe than if the bone has been cut. The drawn up skin when released slips down, protecting the bare end.

From one week to two weeks is a good age to tail the lambs, and while it seems like doubly severe treatment, the wethering and tailing are usually performed at the same time.

FEEDS AND FEEDING

The standard foods for sheep are grass and clover pasture in summer and hay, preferably clover with roots, during the winter. When pastures fail in summer or autumn such soiling crops as green corn, vetches, rape or cabbages may be fed with advantage; or vetches or rape may be used as pasture. During the winter season well saved pea straw or even oat straw may be used as a part of the dry fodder, but if no grain is being fed the flock should have at least one feed daily of well saved hay.

Of the several classes of roots nothing surpasses swede turnips, but greystones in the early part of the housing season and mangels at the end of the winter and spring constitute very satisfactory succulent rations. Corn ensilage of good quality may also be sparingly used if roots are short or it may be fed along with roots or alternately with that food throughout the winter.

The growing of ordinary hay, pasture and roots for sheep feed does not differ from the cultivation of these crops for other classes of stock. Such special crops as rape, vetches, cabbage, lucerne, &c., are easy of cultivation, and may be successfully grown on almost any farm suited to sheep raising.

Clover.

Of all the fodder crops grown on Canadian farms clover is of greatest importance to the sheep grower. All the commonly grown varieties, including alfalfa, (separately treated in these pages), alsike, white and common red, are useful on the sheep farm. On account of their leafy character and sweetness they are greatly relished, and because of their high protein content they are very nourishing.

Practically all of the clovers are useful as pasture, although precautions are necessary when feeding the larger sorts while in very green or immature condition. Sheep graze closely, and do well upon small white clover commonly found in most Canadian pastures.

Alsike is more useful as a hay than a pasture crop, although sheep will graze it freely while young and tender. Common red clover is the chief food crop on the special sheep-man's farm. It affords excellent pasture, but when very rank or succulent, sheep must be grazed on it with caution, to avoid loss from bloating. Precautionary methods outlined in discussing the feeding of rape apply with equal force to the pasturing of clover.

All of the strong growing clovers make excellent sheep hay. Its value is lessened in proportion as it is coarse, over ripe when cut or badly cured. For breeding ewes good clover hay alone may furnish a full ration sufficiently rich to keep up their condition. No other hay is so valuable for young lambs, growing or fattening stock or sheep being fitted for exhibition. It should be fed in small quantities rather than in greater bulk at less frequent intervals.

Alfalfa.

Alfalfa as it becomes known is growing in favour among sheep raisers as a fodder crop. It is not only a heavy cropper but it is one of the most nutritious fodders grown on Canadian farms, and practically all classes of farm animals consume it with great relish. On account of its deep and strong rooting habit it is peculiarly adapted to dry or gravelly bottom land, but it may be grown successfully wherever wheat growing is or may be carried on, except, perhaps, in very cold latitudes. It has a food value quite equal to red clover both as hay or pasture, and because of its

strong growth, producing from three to four cuttings in a season, it is more valuable as a crop. Alfalfa has obtained a strong foothold in Ontario and east, as well as in British Columbia, and is gaining ground rapidly in Alberta, where it is expected to become perhaps the chief fodder crop, more particularly in the dry and irrigated sections. In Saskatchewan and Manitoba it is grown to some extent, and strong hopes are entertained that in these provinces it will yet become one of the staple forage crops.

Alfalfa hay for sheep fodder should be harvested before it becomes tough, and should therefore be cut as nearly as possible to the time at which it is coming into bloom. If allowed to mature beyond that stage tough fibres develop, which are slow to digest and are liable to cause trouble in the digestive tract of the sheep. Sheep feeding on over-mature alfalfa are occasionally lost by reason of balls of fibre forming and clogging the outlet of the stomach. There is no danger from this cause if the alfalfa has been cut on the green side. Alfalfa for sheep hay should therefore be grown alone or with an early grass such as orchard grass. If grown with a later crop the latter has to be cut too green or the alfalfa becomes too far advanced.

Alfalfa is claimed by some, who have had little experience with it, to be unsafe for pasturing sheep on account of its extreme succulence and liability to cause bloat and its attendant evils. An extensive sheep raiser, who has adopted alfalfa as his chief pasture, has the following to say in its favour:—

'Thirteen years' experience with alfalfa convinces me that it is beyond doubt the best and most economical pasture for sheep. I consider it a very safe pasture, as I never yet saw the first evil result to any class of animals, in fact I have never lost a single animal pasturing on this crop. No crop is more valuable, especially as a pasture, and of course for hay as well. It makes better hay than red clover, although by analysis it ranks about equal. It is cleaner than clover and stock eat it more readily.

'For hay alfalfa should be cut when about one-fourth in bloom, put in very small cocks very green, and allowed to cure that way. It is my most valued crop and is good for all stock, pasture and hay alike.'

Vetches.

Vetches, or tares as they are also called, make excellent fodder for sheep, either as a soiling crop or as cured hay. This crop much resembles peas in habit of growth and requires about the same kind of cultivation. Its vines are more slender than pea vines and stand up better when grown with a stiff variety of oats. Vetches are grown extensively for sheep in Great Britain and to some extent in Canada for the same purpose. The writer, while raising sheep, always grew a small area of tares with oats for soiling the show flock, and in case of a shortage of clover vetches were cured for hay. The crop being fine in vine and very leafy is much relished by sheep and constitutes a rich diet.

Two varieties of vetches are grown for fodder. The common vetch is the chief sort cultivated, but the hairy variety is receiving some attention in recent years. The latter produces the heavier yield, but so far the seed having to be imported is very expensive and few care to bother with it.

The soil for vetches should be clean, mellow and rich. The seed may be sown in drills or broadcast. A good seeding for either soiling or hay is about three pecks of vetches and four pecks of oats per acre.

The vetches are ready to feed any time after the crops comes into blossom and before the seed commences to ripen. For soiling, the crop may be hauled to racks or be distributed on the sod of a pasture as soon as cut or it may be allowed to wilt in the swath for a few hours.

Vetch hay is made in much the same manner as clover or timothy is handled.

Vetches may be pastured by sheep, but this is a wasteful practice, as much of the crop is destroyed by tramping.

Rape.

Rape is one of the most valuable of foods for sheep. It is keenly relished and produces rapid gains both in growing and fattening stock. Rape is an easy crop to grow and yields abundantly when properly handled.

The variety of rape most suitable, in fact about the only one grown, for sheep fodder is the Dwarf Essex. This sort yields heavily of leaves and does not produce seed the year it is sown.

The culture for rape is practically the same as for turnips or other root crops, with the exception that it is not thinned in the row. It may be sown broadcast, but unless the soil is clean and rich rape does better sown in drills in order that it may be cultivated.

Rape, like turnips, does best in soil that is rich in humus; the richer the soil the ranker the growth and the better the quality of the fodder. Old pasture sod well worked up makes a fine situation for rape, and if it can be given a dressing of yard manure so much the better. Rape is a very disappointing crop when sown on poor soil, hence the importance of carefully fertilizing and preparing land to be sown to rape.

Early sowing is not suitable for rape. It is well to get the land ready to put in the seed as soon as desired after the ground becomes warmed up in the spring. It may be sown as early as corn and as late as the end of July. If sown in drills the rows should be about 28 to 30 inches apart, and about two pounds of fresh seed used per acre. On clean, rich land about three pounds of seed per acre may be sown broadcast. The writer has found best success from sowing in raised drills, but others claim just as good results when sown on the level. Frequent cultivation is as beneficial to rape as to turnips or potatoes.

Some advocate and practice sowing rape amongst corn at the time of the last cultivation, and others sow in oats, harrowing in the seed when the oat plants are two or three inches high. It is well to learn from careful test upon a small scale whether one's conditions are suited to methods of this kind before undertaking them upon a large scale. A season of rank growth followed by a wet harvest may cause much trouble and annoyance if rape has been sown with oats. Undoubtedly the best crops are produced when rape is given the land to itself and proper cultivation is afforded.

Under average conditions the rape plant requires about two months to reach the best conditions for feeding. When fed too young serious digestive derangement may result, in the form of scouring or bloating. After reaching its growth it remains fresh and crisp for several weeks under normal weather conditions, but after a time it becomes more or less woody or stringy, in which condition stock do not relish it so much.

Rape is usually pastured off, but it is exceedingly valuable for soiling. A feed a day of rape hauled to a flock of ewes on a failing pasture proves an excellent safeguard against the animals running down in condition.

All classes of sheep may be pastured on rape. It is an excellent crop on which to turn lambs after weaning. It is quite as suitable for toning up the breeding flock prior to the mating season.

Precautions have to be observed in pasturing rape. Until they have become accustomed to it sheep should not be turned into rape pasture while hungry. Neither should it be fed wet with rain or dew or at all frosty. If precautions are neglected serious loss may be experienced from scouring, bloating, and even death from inflammation of the bowels. It is well to allow sheep pasturing on rape free access to a

grass pasture. It was the practice of the writer after the season of white frosts had arrived to fasten out the flock from the rape in the evening until the crop was almost or quite dry the following morning. Many rape feeders disregard this precaution, claiming that after sheep become accustomed to it rape feeding is not attended with danger. A feed each morning of oats and bran go a long way toward preventing untoward results. Experienced feeders have found that irregular salting greatly increases the danger from illness when sheep are on rape. A feeder who lost sheep after each salting found a complete remedy in withholding salt altogether while rape was being pastured.

It is estimated that an acre of rape pastured by 40 head of thrifty lambs, receiving a moderate grain ration daily will yield 400 pounds of mutton.

As a soiling crop rape is an excellent mutton maker. As soon as the plants are well grown they may be mown with a scythe or reap hook, to be hauled to the flock either in a shed or pasture. If sown in May it should be ready to cut and feed in July, and at the least one more cutting may be expected during the fall. It should be cut not lower than four inches from the ground, which will leave stumps that will produce a strong second growth. Provided over-feeding is avoided, there is comparatively little risk attending soiling sheep on rape.

Bloat is the most common trouble in rape feeding. When noticed in the first stages the subject should at once be removed from the rape. Salt and water given as a drench is a simple and much used treatment. A pint of strong solution in which all the salt is dissolved constitutes a dose for a full-grown sheep. Aromatic spirits of ammonia is also a good medicine for this trouble. A tablespoonful in a pint of warm water will usually afford relief. If the case is so far advanced that the subject is down and the abdomen much distended, then the latter should be punctured at the point of greatest swelling with a trocar and canula. If, however, one has insufficient confidence in his surgical ability to perform this comparatively simple operation, it may be advisable, if recovery otherwise appears improbable, to adopt the time-honoured policy, of killing the animal to save its life

Cabbage.

Cabbage has long been used as a food for sheep. This crop is easily grown, produces heavy yields and provides an excellent fodder from early fall until well on in December.

Cabbages are grown by the same system as roots or rape. The ground should be worked up and manured the previous autumn. The seed is sown as early in spring as the ground is fit and the weather has become favourable for growth. The date of seeding is about the same as for carrots or mangels. The ground should be finely prepared, and the seed sown in drills about thirty inches apart. After the plants appear above ground cultivation should commence, and when the second leaves have appeared, the plants should be thinned out to about eighteen inches in the drill. Frequent cultivation during the season will insure rapid growth and an abundant yield of excellent fodder. From 18 to 20 tons per acre is not too much to expect on rich soil with a heavy yielding variety.

The crop is ready for feeding when the heads are well formed and have become firm. It may be fed from the field until the time turnips are harvested, when it should be stored in a pit or shed sufficiently protected to keep out hard frost but well enough ventilated to guard against heating.

Cabbages may be fed on the pasture or in troughs in a shed. While the sheep will consume them from the whole head, it is preferable to divide them into comparatively small pieces in order to be more easily eaten. For giving variety to the ration or adding a valuable succulent food, cabbage fills an important place on the sheep farm.

Turnips.

In many of the most successful sheep raising countries turnips are considered almost as indispensable as grass. In Great Britain turnips constitute an important part of the ration of the sheep flocks from the time the crop is ready to use in the autumn until grass arrives in the following spring. To fattening sheep and growing stock they are fed in practically unlimited quantities, but for breeding ewes turnips are considered a necessary part of the ration. In Canada many successful sheep raisers feed turnips. The excellence of many pure-bred flocks in which international prize winners are reared is in great measure due to the liberal use of succulent foods, and no other green crop is so generally used as turnips in the winter season. Apart from their food constituents turnips have a wonderful effect in maintaining a vigorous condition of the digestive organs and general system.

Young lambs born in the winter or early spring are greatly benefited by liberal feedings of finely sliced turnips until grass arrives. Not only are the lambs started into vigorous growth, but their dams are relieved from much worry and tugging.

Previous to lambing, ewes should not be heavily fed upon turnips or other roots; from 4 to 5 pounds per day are very beneficial, but much more than this quantity is liable to cause abnormally large, soft lambs, deficient in vitality. After lambing, the turnip ration may be gradually increased even to as much as will be eaten twice or three times a day, provided, of course, sufficient nourishing dry food is given as well. The turnips keep the ewes in fine vigour and greatly help the milk flow.

Growing and fattening sheep may be liberally fed on turnips, with a suitable grain ration with such roughage as clover hay and pea straw. A ration of turnips is of great assistance in building up young growing stock and fattening animals.

A good method of preparing turnips for sheep is to cut them in strips with an ordinary machine cutter, or they may be pulped. In the latter condition the roots may be mixed with chaffed straw, rendering the latter more palatable than when fed dry.

Mangels.

In localities better suited for the growing of mangels than turnips the former crop may be to some extent utilized for sheep feeding if certain precautions are observed.

For some reason, probably the large quantity of sugar contained in mangels and beets, these roots when fed heavily to sheep bring about an unhealthy condition of the kidneys and other organs. This is particularly true in the early part of the winter, and even up to the spring months, breeding sheep, particularly rams, should not be heavily fed upon this food. In the absence of turnips a few pounds per day of mangels may be given with advantage. As spring approaches they become less dangerous, and by April they may be fed quite generously except to rams.

For late spring feeding, mangels are given preference over turnips by many expert sheep men for the chief reason of their excellent keeping quality. Even well into the warm weather they retain their crispness and flavour when properly housed or pitted. Many turnip-growing sheep farmers in Great Britain and in Canada reserve a pit or cellar of 'Globe' mangels for May feeding, and it is not uncommon to find this root composing a part of the daily ration of show sheep even up to the middle of June. The preparation of mangels for feeding is the same as already described for turnips.

Corn.

Corn is very widely used for feeding sheep. In corn-growing sections no grain is more used than corn for fattening sheep and lambs. For soiling in the fall green corn is an excellent fodder plant, and corn ensilage fills a place on the sheep farm.

Corn is not a suitable grain to feed alone, unless in very small quantities to improve a ration of hay and roots. Sheep fed on corn alone are liable to go off their appetites and become ill from digestive derangements.

Corn should invariably be fed to sheep mixed with other grain. In an experiment in feeding whole corn, corn and peas, corn and oats, and corn, peas and oats to lambs in addition to hay, the corn gave the poorest results of all in gains. The average weekly gains per lamb were as follows: Corn, 2.6 pounds; corn and oats, 2.7 pounds; corn and peas, 3.15 pounds. A mixture of peas, oats and corn in equal quantities fed with hay gave a weekly gain of 3 pounds per head. Bran, oats and corn fed under similar circumstances gave a weekly average gain of 2.3 pounds. If to this ration some such succulent food as turnips or mangels had been added, with a small proportion of oil cake, an ideal fattening ration woud have been compiled.

During the season of failing pastures in the autumn a daily feed of green corn is useful for keeping up the flock. The corn should be put through a cutting box and fed in troughs. A small quantity of bran mixed with the cut corn adds delicacy and feeding value to the ration.

Corn Silage.

Silage is fed to sheep on many farms. When well preserved it is relished by the animals, and affords a valuable succulent food. From 3 to 4 pounds per head daily is about as much as experienced sheepmen care to feed. Fed in larger quantities, or if too acid, it is liable to cause serious indigestion. At this rate silage fed with clover hay comprises an excellent ration for wintering ewes, and when to this a grain ration is added a profitable fattening ration is secured.

In experimental feeding corn silage was found to be about equal to mangels for ewes rearing lambs. The lambs made slightly better gain when roots were fed to their dams, but the silage was produced at a slightly lower cost. The feeding value of good silage and roots for sheep, according to experiment station tests, is about equal. When fed with caution they give similar results on the ordinary farm, but for general practice on the Canadian farm no succulent food can equal swede turnips, on account of their safety and beneficial influence upon the stock. The variation experienced in the maturity and other qualities of corn silage renders it less uniform in its results for sheep feeding. When rich in grain it is too heating, and when immature it is too acid to be easily digested or keenly relished. Where roots are not available silage fed sparingly is a fine substitute, or the two foods may be fed alternately during the housing season.

Peas.

Peas constitute a very important crop on the sheep farm. They are useful as a soiling crop, they are fed unthrashed to fattening stock, as a grain they are highly valuable when mixed with oats, and as a cheap fodder no class of straw can surpass well saved pea straw for wintering ewes.

As a soiling crop, peas are frequently sown with oats, or oats and tares. Sheep delight in a leafy food, and leave only the coarsest of the bare pea vines in the rack. A bushel of oats, a bushel of peas and half a bushel of tares per acre constitute a seeding for a fine mixture to be fed as a soiling crop.

Good judgment and much caution are required in feeding unthrashed, mature

peas to sheep. If given too liberally there is likely to be a loss of animals from over feeding. By commencing with a small quantity, well distributed, the sheep will gradually become accustomed to this food, when it may be cautiously increased. For fattening sheep or milking ewes peas fed in the straw give excellent results.

There is probably no grain ration that can surpass a mixture of one part peas (preferably cracked), two parts oats and one part wheat bran. This mixture is well balanced in essential food constituents, is sufficiently light to be readily digested and it is much relished by the stock. From half a pint to a pint and a half per day is a moderate ration according to the size of the animals and the object in view.

Many of the best flocks of breeding ewes are wintered upon pea straw as the rough diet. If the peas have been harvested on the green side by a harvester that cuts the crop, and taken off without bad weather, the resulting pea straw is much liked and very nourishing. If the ewes come into winter quarters in good condition they will require little else than roots and good pea straw until approaching the lambing period, when clover hay should be gradually substituted for the straw. Ewes that are thin should have at least one feed of clover hay or a small ration of oats in addition to the pea straw.

Pea straw is bulky stuff to feed in racks, and unless the racks are roomy, and the bars so far apart that the sheep can insert their heads, it is preferable to feed the straw on the ground in the yards close up to the fences. If crowded tight against the fence the straw will be thoroughly picked over before being soiled. When feeding pea straw, or other chaffy fodder, great care should be exercised to keep the litter out of the fleeces of the sheep.

Oilcake.

Oilcake is a favourite food on the majority of the leading sheep farms of Great Britain and many of those in Canada. This nutritious by-product of linseed oil works, known as 'cake' by the British shepherd, is peculiarly adapted for sheep and lambs being hastened forward for the show ring or for market. It is not only highly palatable and rich in protein—flesh-forming material—but is pre-eminently a safe food. It is mildly laxative and exercises a salutary influence upon the digestive organs. It may be mixed with any kind or mixture of grain or chop, but on account of its highly nitrogenous nature it is peculiarly adapted for feeding with corn. The feeding of oilcake gives thrift to sheep, enabling them to make the maximum gain from their ration of whatever sort.

Oilcake in the finely nutted form is excellent food for lambs, particularly before grass arrives in the spring. A limited amount, from a quarter to half a pound each, is excellent for breeding ewes or other sheep being wintered on dry feed. For fattening lambs or show sheep it may with advantage be used in generous quantities. As a rule it should be mixed with grain and may form from one-tenth to one-quarter of the grain ration, according to the relative market values of various feeds.

Oats.

Oats should, and usually do, form the basis of grain mixtures for sheep feeding. They are palatable, highly nourishing and safe, and being easily grown they are usually at hand on every arable sheep farm. As a single grain food oats answer practically every requirement. Whether for toning up breeding stock, fitting show sheep or fattening for market, oats is the most commonly fed grain used for sheep.

For young lambs just commencing to eat no better grain can be found than ground oats, with the coarsest of the hulls sifted out. In a few weeks the lambs will take them, hulls and all, and as a rule thrive well. To hasten fattening for market a mixture composed of oats, cracked corn or peas and oilcake in the nut form, mixed

in the proportion of 2, 2 and 1 parts by weight can hardly be surpassed. Lambs on their mothers may safely be given access to a mixture of this sort. Breeding ewes may safely receive one pound of oats daily before lambing, and a larger amount of oats or the mixture recommended for lambs afterwards until they go to pasture.

For sheep that are being fattened oats may constitute the sole grain ration, as after a short time they may be given about all they will clean up without risk of sickness. More rapid gains may be secured from the addition of peas, corn, or oilcake. If the oats predominate and the whole is well mixed heavy feeding may be carried on without much risk.

As a soiling crop a mixture of green oats, peas and tares is much relished and very nourishing. A seeding mixture of two parts oats, two parts peas and one part tares, by measure, sown at the rate of three bushels per acre, yields a heavy and valuable fodder crop. In order to secure several weeks' feeding in good condition seeding should be done at intervals of one week from as early in spring as seeding can be done for about six weeks. The crop may be fed in racks in sheds or pastures, or even distributed in rows on knolls or along fence sides. At a time of failing pastures a few weeks of soiling is highly valuable for keeping up the condition of the flock. Oats for soiling are at their best when headed out and have reached the milk stage.

SHEEP BARNS

Sheep originally belonged to the uplands, where they were able to obtain pure air and the maximum of sunlight. Under domestication sheep prefer dry, airy fields and quarters, and do badly if deprived of these conditions. In the pasture the sleeping place of the flock is invariably the dryest knoll accessible, even when other classes of stock would seek more sheltered quarters. In the old world sheep are comparatively little housed, especially in Great Britain. In Canada, what with cold winters, inclement autumns and springs, a certain amount of housing is necessary in order to produce wool and mutton of the highest quality at the least cost.

On the Canadian farm the sheep house is generally the cheapest and poorest of the stock buildings. A house that keeps the sheep dry and out of the wind answers the requirements. Over zealous sheep men of limited experience occasionally provide expensive barns badly suited for sheep housing because of a lack of provision for proper ventilation. The main features of a sheep barn are the following: good ventilation without draughts, sunlight, convenience for feeding, adjustable divisions, capacity for storing hay, grain and roots, and above all a tight roof and a well-drained location.

The dimensions of a barn will depend on the size of the flock. For breeding stock a space per head of at least twelve square feet is required, and eighteen is not too much for large ewes. However, a barn 40 x 40 feet laid out as shown in Fig. 52, should accommodate from sixty to seventy-five head.

Plan Described.

Movable feed racks sixteen inches wide are desirable. These may form the divisions, leaving an alley three feet wide on two sides of each pen. They should have perpendicular sides with slats on the feeding side far enough apart to allow the sheep to put their heads through. When arranged in this way the sheep do not pick the food out to become trodden under foot and wasted. Where the attendant has to go in among the sheep to distribute the feed, there is always more or less annoyance and loss from litter or chaff getting into the fleece. The feed room is so situated that the root-house door opens into it and the feed from above comes down in chutes.

The doors are large enough to permit of a wagon passing through to take out the manure. In fine weather the upper half of the doors may be kept open. The windows permit plenty of light. The lamb pens are simply hurdles 4 to 5 feet long and 3 feet high, hinged together. A pair of these placed in a corner form a pen. In cold weather for protecting young lambs a pen can be closed in by hanging burlap or heavy cotton from the ceiling to the racks or even to the floor.

Construction.

Any style of construction suitable for other buildings is satisfactory for a sheep house. A somewhat new form of barn which is proving satisfactory where used is represented in Figs. 54 and 55. It has a semi-circular or oval roof, so constructed as to require no dimension timber, and at the same time is self-supporting, requiring no posts on the barn floor. This form of construction requires a minimum of lumber, thus saving much in cost of material. In addition no framing is necessary, so that any handy man can put the building up at a much less cost than an ordinary framed building of similar dimensions could be built for.

For foundation walls, stone and cement concrete are the common materials now

used. A stone wall is stronger if cement mortar is used. Cement concrete is the cheapest and most durable in the end if properly made. The foundation, whether pillars at intervals or a continuous wall, should be put below the frost line on solid ground. The bottom of the wall should be widest, and the slope upwards should be gradual. This will lessen the effect of frost on the wall, as the ground will heave away from it. In building the wall make preparation for putting in a modern system of ventilation.

The accompanying plan, Figs. 52 and 54, provides for a cement root cellar, 12 feet square, 10 feet high at the barn, and 7 feet high at the opposite side. The walls are 1 foot thick. The roof of the root house is also of cement, and the driveway into the barn is over it. The chute for filling the roots into the house is shown in the plan of the upper floor, Fig. 53. This may be placed where desired, even in the barn floor. The studding of the walls for the main barns may be 9 x 2-inch studs, which will leave a large, dead air space, but 6 x 3-inch studs leave more space

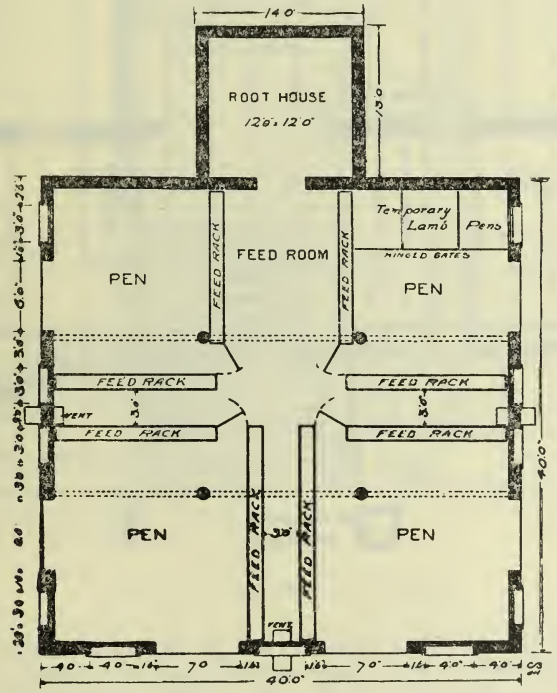


Fig. No. 52.—Sheep Barn, Ground Floor Plan.

inside. These are placed two feet apart. The girders are supported by posts or pillars (either of wood or cement) one foot wide. These should be round or octagonal in form; square corners do much damage if animals crowd or rush against them. Planks 12 x 3 inches and long enough to allow good splicing over the pillars will be strong enough. Two 9 x 2-inch pieces placed 2 inches apart and strengthened by a ⅞-inch iron rod as shown in the dotted line crossing the building in Fig. 55 answer well. The joists may consist of 9 x 2-inch plank about 14 feet long. The walls of the barn, which are 13 feet high, may have the same sort of studding as used below. The studs should be placed three feet apart and project one inch beyond the outer edge of the lower studding.

For the outside, rough boards and tar paper should cover the first storey up to where the studs of the second storey project one inch, then clapboards cover both

stories. Inside, the wall should be sheathed and the ceiling covered with two thicknesses of inch tongued and grooved lumber with tar paper between. This covering will prevent the manure odours reaching the food stored above.

Doors and Windows.

The doors are wide, the end ones being six feet and the side ones seven feet. These permit of driving in to clean out the place, and give liberal room in case the sheep stampede, as they often do if frightened. The top half of each door is hinged

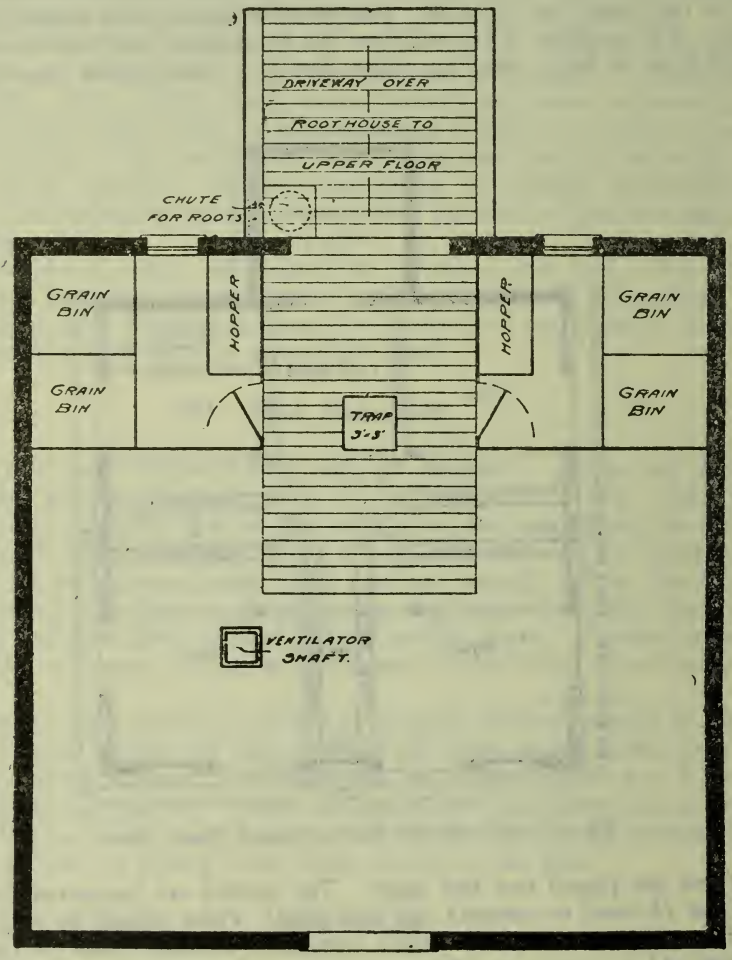


Fig. 53.—Plan of Upper Floor.

above, and opens inwards and upwards. In fine weather these may be kept fastened up. The windows are large, 5 x 4 feet, and placed high up to admit the maximum amount of sunlight. These may be either in two sections and push back towards each other, or be hinged at the top and swing inward like the top half of the doors.

For the barn floor, a single floor, except over the driveway, is strong enough. Dry tongued and grooved material 1¼ inches thick and well nailed makes an excellent floor. The driveway part should be covered with 2-inch plank laid crosswise of

the driveway. As the barn can be filled from the ends it is not necessary to build a driveway floor more than half way through. The feed chute is 3 x 3 feet, and the grain pipes from the hoppers, 12 x 6 inches.

Construction of Roof.

The roof is semi-circular (see Fig. 55). The planks or rafters for the frame are cut with a diameter two-thirds the width of the building. If AC be two-thirds, the width then the arc. ALH forms one-half the roof taking C as a centre. The circle D G H forms the other half drawn with B D as diameter and B as the centre. As each half of each arch is framed exactly alike, it will be necessary to explain but one. Take the arc DGH. This is divided into three equal parts, HG, GM, and

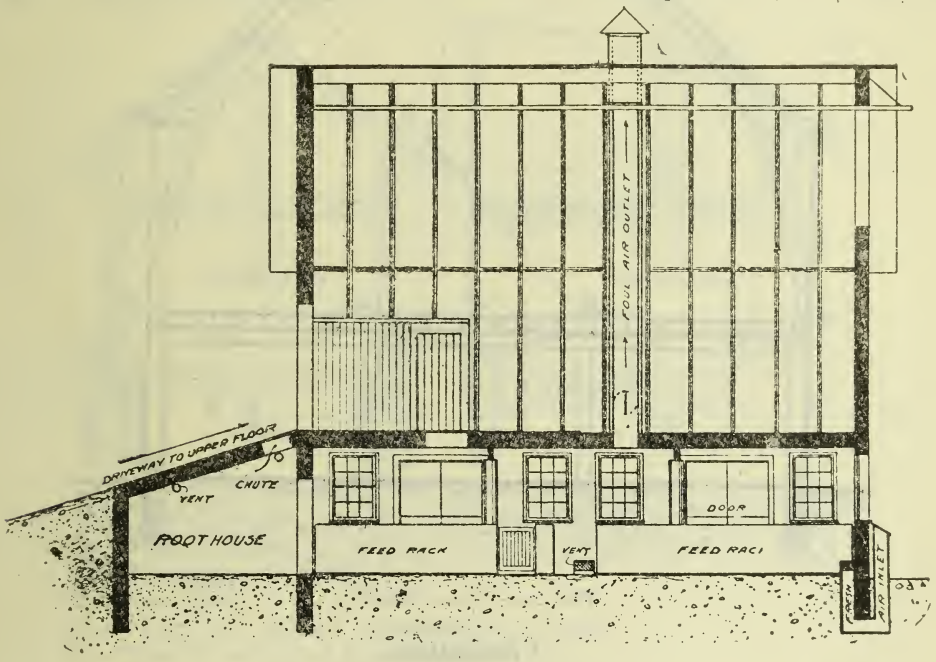


Fig. 54.—Longitudinal Section.

MD. By measuring the length of one of these divisions the length of the plank necessary will be found. In this case the planks are 12 feet long. They should be 10 inches wide and 2 inches thick. Five planks will make the arch or one rafter. In forming the arch the plank should be wide enough to leave at least 2 inches at each end after the side has been rounded off. A straight line passing through the points B and G or G and M will give the cuts at the points G and M. Three pieces form the side and two pieces rounded in the same way are required for doubling over the joints at G and M, meeting at N, the line B N giving the cut. These should be well nailed each to the other. The cut at H is obtainable by a line drawn at right angles to the floor and from the centre of it. The cross piece PR acts as a brace and also carries the horse fork. The eaves project 2 feet beyond the each side by upright planks. These uprights are attached by braces to the main wall. The slope in the piece marked T is obtained by using a circle with the same two-thirds diameter, but the cut is taken on the underside of the plank and then turned, concave side up. Each arch can be framed and put together (always well nailed) on the floor, then raised into place and spiked at the bottom. To support the arches for the door space, a plank is placed across under them and supported at

each side by upright planks. These uprights are attached by braces to the main wall. Some barn doors swing out, others swing in, but rolling doors carefully put up and on good rollers are most convenient and serviceable.

For a flock of from twenty to thirty sheep a building 20 feet wide by 30 feet long, with an addition of a suitable yard, will be large enough. The plan of construction may be practically the same as in the larger building, but proportionately lighter planks may be used in the roof construction.

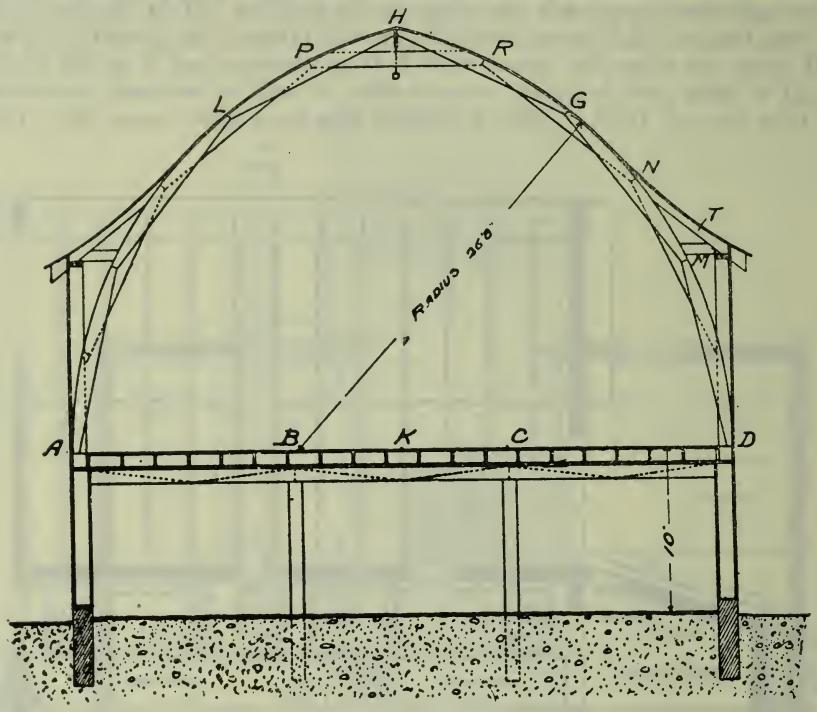


Fig. 55.—Cross Section.

Ventilation.

Many sheep barns are ventilated simply by the doors and windows. If on two sides of the building windows are left partly open the air should be fairly pure at all times. Some prefer to keep the windows closed, depending on a separate system of ventilation.

To-day many systems of ventilation are in use. Some that work well in places are said to fail in others. Much depends on a careful installation of the system, and afterwards careful handling. At the Experimental Farm at Ottawa, many of the best systems have been tried. The 'Rutherford' system, illustrated in Fig. 56 and described below, has proved most satisfactory. In a slightly modified form it has replaced all the others. In this system six 'U' tubes, or boxes, 18 x 9 inches, take the air from the outside, and deliver it at the floor inside. These tiles or boxes are brought up the wall on the outside a couple of feet, and to keep the snow and rain out a board is put on to form a roof, leaving a portion of the sides open to an extent equal to the capacity of the pipe or box. The boxes should go down into the earth at least three feet, so as to avoid any possibility of draft. The opening inside is at the floor level, as shown in Fig. 56. This should be protected by an iron grating. Or the pipe may project a few inches above the floor, the opening at the sides being

covered with wire screens, as shown in the longitudinal section, Fig. 54. This allows a free passage of the air and keeps straw and other material out of the tubes.

The outlet is a double-walled tube having a dead air-space between. It is 2¼ feet square, and both the outer and inner jackets are tongued and grooved lumber. The double wall with the dead air space reduces condensation to a minimum and promotes a better draught. The draught is regulated by a damper in the out-take chute to which control ropes are attached. By closing this damper the outward current is stopped and the inflow very materially checked. The closer the barn is built the better the system will work.

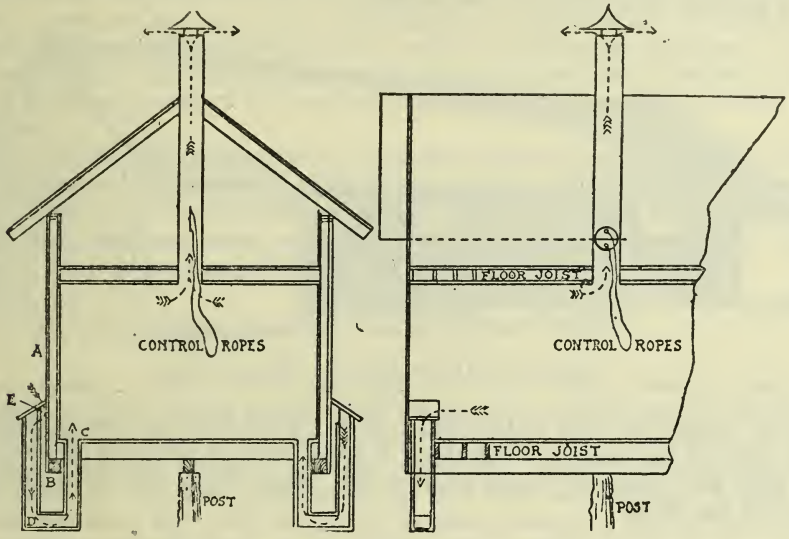


Fig. 56.—The Rutherford System of Ventilation.

A.—Wall of stable.
B.—Foundation of stable.
C.—Floor level.
D.—Intake box through which fresh air passes.
E.—Opening in side of intake pipe.

The drawing on the left hand represents the damper in the out-take pipe open, and the system therefore in full operation. The drawing on the right shows the damper closed, under which condition both the intake and the outtake are inoperative.

An Inexpensive Shed.

The barn described is fashioned after the ideas of extensive sheep owners having pure-bred flocks. It is built rather more substantially than would be necessary for a commercial flock from which early lambs are not yielded. Many excellent flocks of sheep are wintered in simple sheds, facing the south, open in front and closed tightly at the ends and back. It is well also to have the front closed for a short distance from either end. Such a shed should not be less than 20 feet wide. A building 50 feet long, if provided with a comfortable yard, would accommodate 85 to 90 head of medium sized sheep. The feed racks may be movable and stand across the building in pairs four feet or more apart, forming passages for feeding, or they may be constructed against the back wall. Unless the sheep can be penned out of the building when the feed is being distributed the cross racks are preferable, as then the feeder

is not crowded off his legs by the hungry animals, nor are the sheep in danger of having their fleeces littered with fodder. These racks may be used for hay, grain and chopped roots. They should, therefore, be built with close bottoms and sides, the latter about 3 to 4 inches high. The sides should be slatted about 9 inches apart, so that the sheep may poke their heads through while feeding. Racks made in this way save feed from being trodden under foot and each sheep is able to hold its position at meal time. Such coarse fodder as pea straw, or like material, may be fed on the ground in the outer yard. If placed along the fences, in not too large quantities at a time, it will be carefully picked over without waste. What is left may be gathered up to be used for bedding.

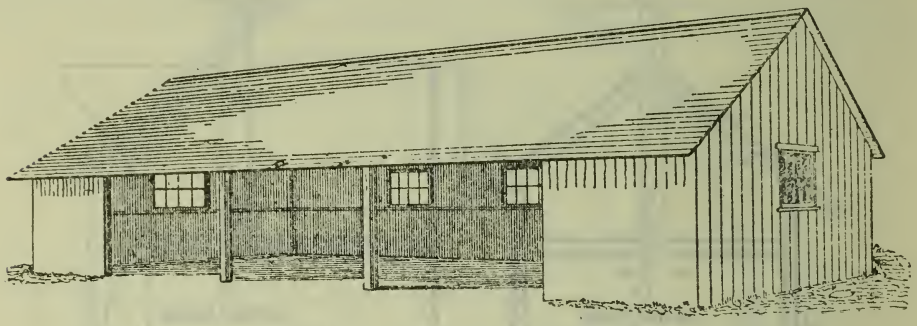


Fig. 57.—An Inexpensive Sheep Shed.

Even though the front of the shed is open a good sized window at each end and two or more at the back are desirable. A stock barn of any kind cannot have too much light and there are times when a cool breeze from the north affords great comfort to the stock.

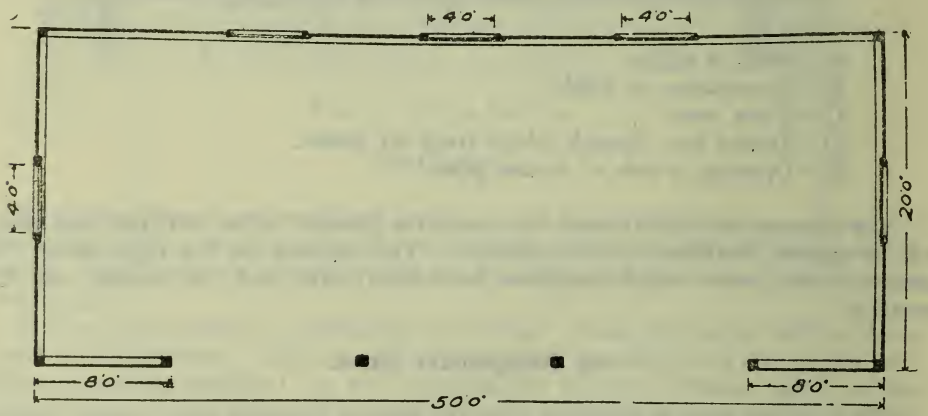


Fig. 58.—Floor Plan of Shed.

Any sort of cheap construction that provides the qualifications of durability and freedom from draughts answers well. The walls may consist of a single ply of inch lumber well nailed on to a scantling frame, battened on the outside and lined with tarred paper, which may be held on by cull lumber as high as the sheep can reach, and by strips above that line. The roof must be close and the floor dry. With these qualifications the cheap house described and illustrated in Figs. 57 and 58 fulfils all the actual requirements of a sheep barn, unless one raises early lambs. In such a case warmer quarters provided with small divisions and conveniences are necessary.

SHEEP AS WEED DESTROYERS

The variety-loving habits of sheep in the matter of diet render them very useful in destroying weeds that give trouble in crop growing. It is a well undersood fact that the sheep-raising farmers have the cleanest as well as the richest farms. It is calculated that fully ninety per cent of the troublesome weeds are readily eaten by sheep, and these include practically all of the kinds that demand special methods of cultivation on many Canadian farms. With intelligent management cropped land may be entirely cleaned of nearly all weeds, while the few that remain will be so thoroughly kept in check as to give little trouble. If allowed to act as scavengers, sheep will render excellent service in the work of cleaning up permanent pastures, private roads, fence borders and other out of the way places, and if turned on stubble following a grain crop many late seeding weed plants will be nipped off and turned into mutton.

The broad statement, that sheep consume a large percentage of farm weeds, is too general to be very instructive. In the preparation of this bulletin a number of successful sheep men were consulted with a view of securing specific information upon the weed question, based upon experience and observation. In the following paragraphs these authorities tell their own stories.

Sheep Improve the Grade of Wheat.

A. D. Gamley, Man.—'I feel ashamed that after keeping sheep so many years I am unable to give you the names of all the noxious weeds sheep will destroy, but I have no doubt the reason is on account of the sheep. These weeds never bothered me much, and in this respect I was not observant; however, it seems to me that they eat them all, with the exception of the blue burr and thistles. Before coming here from Brandon I kept from 100 to 120 breeding ewes, and had unlimited pasture where they were herded from seven in the morning until five or six in the evening, when they were turned into a seventy-acre pasture field, and where they also remained on wet days. There never was a weed to be seen in this pasture. In the fall after the grain was stacked they were turned on to the summer fallow which had grown heavy with weeds. Because I had no fencing then I could not turn in the sheep until the grain was nearly all stacked; in a very short time the field would be as bare as a billiard table. I might say that in one or two years when wheat was being docked from two bushels to five and seven bushels to the load, I was shipping my own wheat from Martinville and had the grade certificates come back marked no dockage, and one per cent is all I was ever docked. My summer fallow would be from 40 to 70 acres, and at times would have from 175 to 240 head, including lambs, feeding upon it.

'I might mention an incident that occurred this summer, and which taught me a lesson. I had two or three acres of rape sown with the ordinary grain drill but with only a few holes left open. I mixed the rape with oats that got badly heated in the granary, and which I thought would not grow, but they grew. I ran the cultivator through once but had no time to do it again. The sheep happening to get on to it one day, I noticed that they ate the oats and left the rape, so I put them on an hour every day until the patch was rid of oats and other weeds and only the rape left. I did the same with the potato patch, and they cleaned that up. They will not eat potato tops, at least not until late in the summer. There is not the slightest doubt that if a farm is fenced so that sheep can be put just where wanted they cannot be beaten for ridding a farm of weeds, and I think they and the growing of barley are the only solution to the wild oat problem.

'With regard to hay, sheep will eat most of the weeds in the hay, before the hay;

they pick the weeds out first. They are not over-fond of stink weed, a very troublesome plant in Manitoba, but will feed on it when young, and will eat off the seeds after the plant has matured.

Blue Weed and Wild Mustard.

Richard Gibson, Ont.—'My first experience with sheep as land cleaners was on an abandoned farm on Long Island, on which grew a quantity of second growth scrub difficult to subdue. We cut down the scrub growth and put on sheep to keep down the following year's sprouts. For the purpose we had Atwood Merinos and imported English sheep of the mutton persuasion. The Merinos were infinitely better for the purpose than my English favourites. They continued to work day after day, nibbling here and there wherever a sprout presented itself. The English breeds on the other hand wanted their meals served up by English butlers; give them good grub and all the leisure between meals and they are barons of their order, but work they will not.

'On my present farm, purchased a number of years ago, the pastures were overrun with the weed known as the blue weed, locally called 'blue devil.' One eighty acres was a complete mass of blue flowers, admired by all artists or poets who passed thereby. I doubt if to-day 100 plants are in flower on those eighty acres. Sheep alone did it, and registered Shropshires at that. The sheep disdain eating this plant until the flowers are in evidence, then they nibble the heart out, flowers and honey—not a bad combination, especially for sheep.

'I believe sheep would eradicate wild mustard if used intelligently for that purpose. They are very fond of it in two stages of its growth I am convinced. They eat it readily when very young and again when in blossom. I cannot bear this out from experience with wild mustard, but I do know that in my part of Lincolnshire white mustard was extensively used as a forage plant, more particularly for breeding ewes during the autumn.'

Weeds Increase as Sheep Decrease.

John Jackson, Ont.—'I might name a few of the noxious weeds that sheep will readily eat as follows: annual sow thistle, oxeye daisy, rag weed, wild mustard, wild vetches, and, even Canada thistles when young and tender. They will also eat the buds and flowers of thistles when in the latter stage. I believe sheep will eat about ninety per cent of all the noxious weeds that grow on the farm.

'The best way to handle sheep to give best results in destroying weeds, is to put them on when the weeds are young and tender, allowing them to pick everything close and bare; then change to other pasture, allowing the weeds to get a fresh start. Keep up this alternate system so the sheep will get the weeds in their tender stage of growth.'

Telfer Bros., Ont.—'Too much cannot be said in favour of the sheep as a weed exterminator. Rag weed is very common throughout the country, and I am of the opinion that were more sheep kept this weed could be practically put out of business, as they are fond of it in its earlier stages of growth.

'I have had good results in pasturing a few lambs in the corn fields. They eat many of the weeds and do little or no damage to the corn. Our observation leads us to conclude that farmers who keep sheep have very much cleaner farms than those who do not, and this we attribute to the fact that scarcely any weed escapes them even if pasture is plentiful.'

J. W. Clark, Ont.—'As weed exterminators sheep have no equal, being very fond of nearly all weeds. There are only three of four weeds they will not eat readily, namely: toad flax, orange hawk weed, and these they will eat if pasture is

not very plentiful. They are very fond of the perennial sow thistle. While I have not had experience with this weed on my farm, while going through the province on institute work many farmers have claimed that the sheep would completely eradicate this most troublesome weed in pasture land, keeping it nipped off so close to the surface that it could not exist for any great length of time. The oxeye daisy is anther weed that sheep will keep in control on pasture land. Rib grass, sheep are very fond of and will keep in check. The rag weed can be kept from seeding after the crop is harvested, by a good flock of sheep; they will eat the tops if the pasture is not too plentiful. Too much cannot be said in their favour.'

A number of other correspondents substantiate in a general way the information contained in the above letters. Others state that their land is kept so clean of weeds by sheep as to render it impossible to make observation upon the kinds of weeds eaten by this class of stock. The latter is probably the strongest evidence one could have of the value of sheep as an aid to clean farming.

Ragwort—The Source of Pictou Cattle Disease.

Certain plants that are prejudicial to the health of other classes of stock may be eaten by sheep with no apparent risk or inconvenience. The most conspicuous example of this class of weed is ragwort *(Senecio Jacobœa),* a plant very prevalent in Prince Edward Island and counties of Nova Scotia bordering on the Northumberland Straits. Through experiments conducted on a large farm at Antigonish, Nova Scotia, by the Health of Animals' Branch of the Department of Agriculture, it was discovered a few years ago that the fatal Pictou cattle disease is a direct result of the continued eating of this weed in its dried state. Further experiments have proved not only that sheep are not harmed by eating ragwort, but they enjoy it as a diet to such an extent that the plant soon disappears from an infested field when pastured by a flock of sheep of sufficient numbers to adequately cope with the vegetation. From information already secured it is evident that while this weed exists as at present over the infested areas, cattle raising cannot be carried on without careful precaution and great risk. Being widespread over rugged hillsides, wood lots and other untillable areas, the only practicable method of eradication is through the agency of sheep. Fortunately the country infested is well suited for sheep raising, being capable of producing an abundance of winter feed, while the hilly pastures and other rough lands are admirably adapted to this class of stock. As weed eradicators, sheep can perform a service of great value to the ragwort infested areas of the maritime provinces.

ANIMAL ENEMIES OF THE SHEEP

The Dog.

Fortunate is the sheep breeder who is not from his own experience compelled to regard the roving dog as the natural enemy of the sheep. Many excellent flocks have been ravished and ruined by sheep-killing dogs, and their owners discouraged in the keeping of sheep. For the decrease of sheep in all parts of Canada the annoyance and loss from dogs is given as the chief cause. There is perhaps no experience on the farm so heart-breaking and vexatious to the shepherd as to find in the morning that the dogs have been amongst his flock. Upon going to the field he finds a number of the choicest ewes torn and bleeding or killed outright; others with their forearms so chewed and thighs lacerated as to render them hopeless cripples. Those not bitten are so exhausted, frightened and upset as to be practically ruined for further usefulness. For weeks they will start and rush about from the least unusual sound, until restful feeding and thriving is out of the question. Nor does time correct the evil. Regular breeding is interfered with and losses at lambing time are greatly increased. Even though a hundred per cent of the actual damages are made good by municipal appropriation for the killed and injured animals, the loss is not nearly met. The writer can speak from experience on this point. On a single night more than a score of breeding ewes, nearly all imported from Britain, were bitten or torn. While the immediate fatalities did not exceed half a dozen head, the damage was estimated to be sufficiently large to warrant the council in granting five hundred and twenty-five dollars—to the council a large appropriation, but to the flock owner a very inadequate compensation, not greater in proportion than one thousand dollars' insurance on the loss of a five thousand dollar property. The destruction occurred early in the summer while the lambs were young. The ewes went off their milk, and being restless and timid failed sadly in condition. Many did not get in lamb in the fall, and a number that did gave endless trouble with each succeeding lambing time from unnatural presentations and losses therefrom. The once valuable flock selected in Britain and at home at great expense was practically ruined.

The experience described is not overdrawn, as very many sheep owners can affirm. Unfortunately only sheep men can appreciate the extent of injury to the industry effected by dogs, with the result that adequate protection by legislative bodies is practically impossible to secure. Even the small tax of one dollar for dogs and two for bitches is looked upon by many as an unjustified hardship on the poor man who so frequently likes to harbour two or more useless canines. The people who keep the dogs have no interest in the sheep, and as they are vastly in the majority, measures calculated to restrict the freedom of the dog are almost invariably shelved on first presentation, and afterwards killed or modified until practically useless.

Is it not time for sheep owners and others interested in the industry to unite upon this question, which is so closely allied to successful agriculture? During the past 40 years the sheep stock of Canada have greatly decreased. The chief cause of this falling off was undoubtedly the worrying dog. That such an industry should be handicapped and in many cases ruined by, not the valuable dog that his owner cares for, but the pestiferous cur that is not only useless but a detriment to a district, is a situation difficult to understand. And yet adequate legislative protection is denied the sheep. Sheep are seldom or never killed during the day time, which fact greatly simplifies the working out of a satisfactory measure. A dog away from home and unattended during the night hours is a dangerous animal, and for the purpose of sheep protection should be regarded as a wild beast and treated accordingly.

It is true that most of the provinces have on their statute books Acts for the protection of sheep, but in no case does the sheep receive such consideration as the

wild deer of the forest. According to the game laws of certain provinces:

'No hounds or dogs accustomed to pursue deer are allowed at large where deer are found, during the close season for deer.'

The law in Ontario further provides that:

'Hounds or dogs running deer during the close season may be killed on sight by any person, who shall not be liable to damage for so doing.'

So far as the legislation for the protection of sheep is concerned we have made little or no advance for several centuries. We find that in 1648 the general court of Massachusetts made an order in which the following appears:—

'If any dogge shall kill any sheepe the owner either hang his dogge forthwith or pay double damages for the sheepe, if ye dogge hath been seen to course or bite any sheepe before, not being sett on, and his owner hath notice thereof then he shall both hange his dogge and pay for the sheepe.'

This old regulation was calculated to protect the sheep in the same way that our present game laws protect the deer, while the sheep in many municipalities are reseiving a much less serious consideration. In the twentieth century it would appear as though the dog industry receives greater consideration by legislative bodies than that of the sheep.

Methods of Protection.

While many sheep raisers have dispersed their flock because of the dog nuisance, and others for the same reason have hesitated taking up the industry, there are many who have discovered successful methods of guarding their flocks from attack.

The employment of half a dozen sharp sounding bells attached to the necks of individuals is common practice. This, however, is not always successful. Flocks wearing this supposed safeguard are occasionally attacked and its members worried, but if the sheep can approach within earshot of the dwelling, the shepherd is likely to be aroused as he is ever on the alert in regard to his sheep.

A troublesome custom, but considered the best safeguard by many, is to bring the flock at night to a field or plot adjacent to the barn. Unless provision is made for feeding in these quarters the sheep cannot thrive satisfactorily. They are early to rise, and should not have to wait long after daylight for the morning meal, especially if this has to be gathered from a sparse pasture at some distance from the sleeping place. The plan has points to commend it if the feeding difficulty is overcome. All sheep should be seen once daily, and twice is even better. To provide night pasture two plots should be sown with suitable fodder and the flock given access to these alternately, giving each a chance to grow up in its turn. If these are fenced with dog-proof fence the surer will be the protection. A modern woven wire fence 5 feet 6 inches high, with cross wires not more than 5 inches apart, and having a barbed wire at the top and at the bottom close to the ground will keep out dogs, provided no objects are left that would be of assistance in jumping over. A further safeguard is to nail a slat fifteen inches long pointing outwards and upwards to each post and attach two strands of barbed wire to these.

An extensive sheep raiser recommends the use of a dog-proof woven wire inclosure, locating it in the pasture and moving it from place to place on knolls needing fertilizing. It is suggested that five dollars worth of material would provide a moveable pen large enough for fifty sheep. The labour of inclosing and liberating the sheep would be much less irksome than milking cows or feeding hogs.

Still another plan is to give the flock access to the home building during the night, or at all times, if convenient, by leaving openings from the field to a lane leading to the barnyard. If the salt box is kept at the building the sheep will regard the point as the one centre of meeting, and to this they will run when molested in the field. It is very important to have the gap immediately at the corner of the

pasture nearest the barn. If at the side of the field, the sheep, when being driven, are likely to miss the gap in their terrified flight from their pursuers.

Predatory Animals.

In many sections of Canada, more particularly west of the Great Lakes, the sheep-raising industry is seriously injured by the depredations of predatory animals. The most common of these are the coyote, the timber wolf and the panther. The coyote is troublesome in each of the western provinces, the timber wolf is the cause of loss in Alberta and British Columbia, while the ravages of the panther are confined to the Pacific province. In addition to these the brown bear occasionally takes a lamb in back sections of Quebec, New Brunswick and Nova Scotia. The coyote or prairie wolf is especially destructive to young lambs, but when once the habit of sheep killing has become fixed unprotected flocks in coyote-infested districts suffer from their depredations.

A number of remedies for the coyote nuisance have been adopted, with more or less success. Close, high wire fencing is effective, but quite expensive. The ordinary bounty of $2 for mature coyotes and $1 for pups helps to reduce the number, but the systematic and careful use of poison at the proper seasons is the most effective remedy. The Board of Sheep Commissioners of Oregon, a body reporting estimated annual losses of 150,000 sheep in the state by coyotes, has worked out a number of practical methods for destroying these pests. The following quotations are from Bulletin No. 2 issued by this board:—

'Granting that it will be possible for the one thousand sheep men to average the destruction of ten coyotes each for the winter months of the year, and approximating that half of this number of destroyed coyotes will be pregnant females that would have given birth to an average of six pups each during the following spring, this alone would account for forty thousand less coyotes in the fall of the same season.

'For coyotes, use No. 3 spring steel traps fitted with swivels and attached to a log or stone weighing thirty pounds upwards. It is well to see that the trap is placed on a level with the surface of the ground and the jaws of the trap are covered with a piece of thin paper, and this can further be covered with particles of fine earth; this can be further masked by the sprinkling of water upon the earth-covered trap. The use of artificial scent will here be found useful.

'When hunting with hounds the dogs should be inclosed in a wagon fitted with spring doors that can be tripped by the driver, thus allowing the dogs to make their exit and quickly enter the chase.

'During the month of May the young coyote pups may be heard in their dens and burrows, and can be easily destroyed by digging them out, or by the destruction of their mother. This method is more generally used than all others.

Poisoning.

'Of all available methods for coyote destruction, poisoning is admitted to be the most practical and efficient measure, and no poison has been so succesfully used as two grains of dry sulphate of strychnine inclosed in two grain gelatin capsules. The gelatine capsules filled with strychnine after being wiped free from any external appearance of strychnine should be further protected from the dissolving effects of moisture, contained in the air and the juices and water contained in the several materials used as a bait, by covering same with several coats of tallow. This may be best done by dipping the capsules in melted tallow.

'Several materials are highly recommended as being useful for coyote bait, and are used and prepared as follows:—

'*(a)* Lard, beef suet and tallow. Cut these into pieces the size of a walnut and

insert therein one of the capsules of poison and securely close the cavity.

'(b) Particles of liver. Cut into pieces the size of an egg and insert therein by means of a slit one of the capsules of poison in each piece.

'(c) Eggs, into which one of the capsules of poison has been placed by means of a small opening in the end.

'(d) Prunes, into which one of the capsules has been inserted.

'It is necessary that all materials used as bait to contain poison should be handled at all times with either forceps or gloved hands, as coyotes can easily detect human scent when a bait is touched by persons not wearing gloves.

'Eggs and beef suet will be rendered more easily found, both by the coyote and parties wishing to remove the same from the range if the bait is covered with blood. This is especially recommended when snow covers the ground.

Precautionary Measures.

'Eggs and prunes are said not to be readily eaten by domestic dogs. Beef suet, lard and tallow can be rendered less likely to be picked up by dogs if holes are bored in irregular pieces of wood and the suet, lard or tallow containing the poison placed therein. These offer the advantage that they may be distributed from horseback along the decoy trails and in the vicinity of the decoy bait, and in the morning can be removed from dangerous exposure. Lard and tallow should be easily used in this manner.

'All sheep men shall exercise great care in putting out poison, and take every reasonable precaution to prevent it from being taken by dogs or other domestic animals. All poisoned carcasses that have lain so long that they cease to be useful, or where they are so situated as to be easily accessible to dogs, should be destroyed by burning. (Unless buried at a sufficient depth the bones of such carcasses may be uncovered by badgers, and many months afterwards be the cause of poisoning of a valuable dog.) Poison should never be placed nearer than one-half mile of any highway or road or any residence or house. If placed nearer than one mile from any house or dwelling the occupants thereof should first be notified. Do not put out poison on lands or ranges other than those owned, leased or occupied by you to the exclusion of other persons, or unless you have the express consent of the lawful owner or possessor thereof. Do not place poison near enough to any road or highway to attract dogs passing along. Poison should rarely ever be inserted in meat containing bone. If a carcass should be poisoned be sure to completely destroy all remaining bones by burning. Written notices should be placed in conspicuous places near carcasses and about one-fourth mile therefrom when practicable. Dogs should be muzzled or tied up during the poisoning season. All small poisoned baits should be picked up, after using a reasonable length of time, and destroyed. After the season is over all poisoned bait should be destroyed, whether old or not. Be extremely cautious and careful at all times in the putting out of poison, and success will crown your efforts.'

It should be observed that the exposing of poison for wild animals is prohibited by law in some of the provinces, while in other provinces it can be done only according to regulations. Before exposing poison for wolves, coyotes, or other predatory animals one should learn and follow the regulations in force in the province in which it is proposed to expose the poison.

Timber Wolves, Bears and Panthers.

Timber wolves and panthers are sly and difficult to trap. The most popular method of destroying these is to hunt them with dogs and guns. The substantial bounty offered for their heads by each of the provinces proves an incentive to hunters to seek this class of game.

Loss from bears is likely to diminish with the removal of timber and the attendant extension of agriculture. An enthusiastic sheep raiser residing in northern Quebec finds it profitable to bring up his flock to the barnyard during the summer and fall months. The residents of this vicinity are ever on the alert for bears, with the result that the number is being reduced each year. Steel bear traps are used in isolated spots, but these are objected to because of the danger to farm stock. The 'dead fall,' intelligently used, each year accounts for a number of bruins, but the dog and the gun directed with the judgment of an experienced hunter are probably the most effective weapons of extermination.

DISEASES OF SHEEP

By the Late J. G. RUTHERFORD.
Veterinary Director General and Live Stock Commissioner.

Sheep in Canada are particularly free from disease. The climate of this north land has proven to be particularly healthful for sheep. Alike in the clear, cold climate of the west and the snowy winters of the east, sheep do well, their warm coats protecting them sufficiently, while the pure air and sunshine keep the lungs and consequently their whole system in good order, so that good health is practically assured, if the management is even half what it ought to be. This bulletin would, however, hardly be complete without a chapter on at least the most common ailments which may be now and then met with.

The diseases of sheep may be divided into several classes. First those caused by external parasites such as scab and foot-rot; along with these may be mentioned ticks and lice, which when neglected frequently bring about an unthrifty condition bordering closely on disease. Then there are internal parasites such as worms of various forms, which may infest the stomach, the intestines and the respiratory organs or the head.

Digestive derangements, too, manifest themselves at times. To these may be added diseases and accidents peculiar to reproduction.

Scab.

Sheep scab, when once introduced into a flock, must be dealt with by thorough measures. It is a strictly contagious disease caused by a minute specific mite technically known as *Psoroptes Communis Ovis*. It is so small as to be difficult to discern with the naked eye. This disease generally affects the parts that are covered with wool. It usually begins at the upper part of the body, thence spreading over the neck, shoulders and hips, extends slowly but surely in ever-increasing areas. In two or three months the entire body may be affected. The disease spreads, as a rule, much more rapidly during the winter than in the warm weather. In sheep on grass, after shearing and washing it may remain for a long time in an almost latent condition. Sheep well fed and otherwise strong and healthy resist its ravages in a remarkable way, while those which are thin or badly nourished, rapidly become debilitated, and if left untreated, live but a short time. Affected sheep experience great itchiness with irritation, formation of pauples, inflammation, and the development of crusts or scabs under and near the edge of which the parasite lives. The sheep are restless, they scratch and bite themselves, rub against fences, posts, &c., as if in great torture. The fleece assumes a tufted, ragged and matted condition. Tufts of wool are pulled out by the sheep with the teeth, or are left on fences, posts, &c., where they have rubbed; to each tuft scabs are attached, which are usually replaced at the seat of origin, by thicker or more adherent crusts. The skin becomes more or less bare and furrowed, and from the furrows blood oozes. Without treatment the disease goes from bad to worse, spreading the infection, which is readily taken up by other sheep which may come into contact with a diseased one or with infected objects.

Under the provision of the Animal Contagious Disease Act it is the duty of every owner, on perceiving the appearance of sheep scab in his flock, to give immediate notice to the Minister of Agriculture at Ottawa, and to the nearest veterinary inspector of the Department of Agriculture, of the suspicion or presence of the disease. Instructions will then be issued and carried out according to government regulations.

Two principal preparations are recommended for the treatment of scabby sheep, the lime-and-sulphur dip and the tobacco-and-sulphur dip. The former is recommended and used by the Department of Agriculture. Its preparation is as follows: Take 10 pounds fresh lime and add enough water to make a paste. Sift into the lime paste 24 pounds of flowers of sulphur and stir thoroughly. Boil this mixture in 30 gallons of water for 3 hours, frequently stirring the mixture. The solution should then be a brown or chocolate colour. Allow the mixture to stand for a few hours, preferably overnight, and then draw off the liquid. Care should be taken not to disturb the sediment, which is slightly injurious to the fleece of the sheep. To this liquid add sufficient water to make 100 gallons. It should be used for dipping at a temperature not lower than 106 degrees, and not higher than 112 degrees Fahrenheit. The hot dip softens the scabs and destroys the mites. The sheep should remain a full two minutes in the tank. The head should be plunged, and if there are thick crusts on the skin the dip should be rubbed into the wool with a stiff brush or otherwise. Two dippings are necessary at intervals of from 10 to 12 days. In very bad cases a third dipping may be necessary. The sheep should be clipped whenever possible before dipping. When the flock has been dipped once, their quarters should be changed; the barns, fences, &c., where they have been kept should be well covered with a lime wash containing at least five per cent of pure carbolic acid or creolin. Further instructions for dipping are given elsewhere in this bulletin.

Foot Rot.

Foot rot is of two kinds, viz., contagious and non-contagious. The latter is a simple disease usually due to excessive wear of the hoof and the irritation caused by the introduction of dirt to the sensitive tissues of the foot. It is, therefore, most prevalent on low, wet land and in filthy yards and barns.

Prevention is better than cure. Sheep should not be fed in wet, muddy or filthy places. Their hoofs should be examined and pared when necessary to remove superfluous horn. When the disease appears in a small flock the hoofs should be trimmed down closely and the feet washed or soaked in a solution of copper sulphate, 1 ounce to 2½ pints of water, then dressed with watery solution of chloride of iron or with chloride of antimony, or preferably with a mixture of equal parts of chloride of antimony and tincture of myrrh. After such dressing the raw surfaces should be protected by a coating of pine tar or gutta percha varnish. Then remove the animals to a dry, clean pasture. If the disease is not of long standing this treatment will generally effect a cure, although in confirmed cases where much destruction of tissue has taken place it may be necessary to repeat the dressing several times.

For large flocks on the range or elsewhere a more general treatment is necessary. A suitable solution is made in the proportion of ten pounds of copper sulphate, dissolved in five gallons of water. The solution is put in troughs two or three inches deep. The sheep after being driven through the water, preferably running water, to cleanse their feet, are, by using a narrow chute, made to pass one by one through the preparation. As an alternative to the above, affected sheep may be held for a short time on a floor sprinkled to a depth of three inches with freshly slaked lime.

Canadian sheep men may be thankful that the contagious form of foot-rot is almost unknown in this country. The few cases seen are as a rule in recent importations. For this reason imported sheep and others that have travelled in dirty cars should be carefully examined on arrival and treated at the same time as they are dipped. Prevention of the trouble is much cheaper than effecting a cure. Treatment is similar to that described above, although owing to the persistent nature of the disease recovery is generally much more protracted. As in this form the trouble begins in the skin of the interdigital space and works downwards through the sensitive laminæ, it is advisable to dress the skin between the dew-claws with a mixture

of one part carbolic acid to ten parts of glycerine, or with vaseline twenty parts to one part of iodine.

Ticks and Lice.

In examining sheep for skin disease it is well to remember that they are subject to infestation with lice and ticks. Of these the louse is most to be dreaded, both on account of the rapidity with which it multiplies and the serious effects which it is liable to produce on the health, as well as the wool, of its unwilling host. The tick, which by the way is not a true tick but really belongs to the louse family, while much less prolific, develops rapidly and is most frequently troublesome in lambs, although like the white louse it is found on sheep of all ages. As in other species of domestic animals, these parasites are most frequently found and appear to flourish best on thin and badly nourished sheep rather than on those in good condition. When present in any number both ticks and lice induce great irritation, causing the sheep to scratch with the hind feet, gnaw the sides and rump and rub on any convenient object in a manner very similar to those affected with scab. In this way the fleece is often seriously depreciated, while from its mode of feeding, the louse also cuts the fibre near the root, thus greatly lessening the growth and value of the wool. The effects on the skin of the attacks of these animals, and especially that of the white louse, may very easily be mistaken for scab unless a careful examination is made. It cannot, however, be too often repeated that there is no excuse for error in a diagnosis of this kind, for although scab, lice and ticks may undoubtedly exist on the same animal, a sufficiently close and painstaking investigation, with the aid of a moderately powerful pocket magnifying glass, will enable any intelligent observer to reach a definite conclusion as to the nature of the trouble, whether it be simple or compound. It must be borne in mind that the presence of lice is no proof that a sheep is free from scab. While the converse is also true, it is not so important, as while lice and ticks are disagreeable and unwelcome guests, their presence is a matter of slight consequence, especially to the sheep owning public, as compared with that of the smaller but more deadly and persistent scab mite.

Stomach Worm.

The stomach worms, of which there are several varieties, are generally somewhat under an inch long and live in the fourth stomach. Lambs suffer particularly from their attacks, which begin any time after the little fellows start to eat grass, and many continue even till cold weather comes. Some of the symptoms in lambs and sheep are loss of flesh, dullness, langour, failing appetitie, thirst, occasional colics, black diarrhœa, dry wool, chalky skin, and a general anæmic condition. Lambs and weak sheep are specially affected by these pests, which frequently cause death, while strong healthy sheep, though infected, may show but little evidence of the fact.

The worms in the stomach produce eggs, too small to be seen by the naked eye. These pass out of the animal in the droppings and hatch in a temperature of 40 degrees Fahrenheit or over. Their most favourite hatching place is in muddy stagnant water. They will not develop in pure water, and when deposited there, generally die in the course of a few weeks. These little worms grow until they are about one-thirtieth of an inch in length. After being swallowed by a sheep or lamb they arrive at maturity in three weeks or a month.

Good management seems to be the best remedy for these pests. Keeping the digestive organs in a healthy condition by the use of roots in winter and vetches, rape or other succulent plants in summer, along with other foods, seems to be a preventive. A liberal allowance of salt should be furnished regularly. In infested districts the pasture should be hurdled off and the sheep kept on one plot for about ten days and then moved to the next. This should be done from June to October. This method

keeps the sheep from feeding over infested pastures, preventing reinfection, as at least two weeks are required for the eggs to hatch. Pastures known to be infected should either be ploughtd up or thoroughly dressed with lime and salt.

Many remedies have been tried with more or less success. Gasoline, coal-tar, lysol, creosote, kamala and bluestone (copper sulphate) are used. Possibly the last named is surest to reach the fourth stomach of the animal, which the parasites mostly inhabit. This treatment has been used successfully in Cape Colony and is recommended by the authorities there. The bluestone should be pure and clear blue in colour. Dissolve 2 ounces of finely powdered bluestone in one gallon of warm water, or better, dissolve it in a quart of boiling water, then add the remainder and mix. The doses are as follows:—

Lambs three months old 1 ounce of the solution.
Lambs six months old 1½ ounces of the solution.
Sheep twelve months old 2½ ounces of the solution.
Sheep eighteen months old 3 ounces of the solution.
Sheep twenty-four months old 3½ ounces of the solution.

Care should be taken to give the right amount according to the age of the sheep. When kamala is used it should be given once a day in doses from half a drachm to a drachm in thick gruel, treacle or raw linseed oil. Picrate of potash, which is highly recommended by continental authorities, is administered daily in doses of from 5 to 20 grains, according to the age and weight. It is said to be less irritating than any of the other remedies mentioned.

Except in one or two localities, Canadian sheep men have not suffered to any extent from the ravages of this pest.

The Grub Worm.

The grub worm is found in the sinuses of the sheep's head. It is the offspring of the sheep gadfly *(œstrus ovis)*. The eggs are deposited in the sheep's nostrils and when hatched the worms crawl up into the sinuses and become full grown grubs.

Prevention is undoubtedly better than treatment, although skilful shepherds are often able to relieve the sheep of their unwelcome guests by trephining the sinuses. Feed well and keep the sheep strong and healthy. Tar or fish oil smeared on the noses of the sheep or placed on the edge of narrow salt troughs or around 2-inch auger hole in a log in which salt is fed, will help to keep the flies away. A dark place during the midday heat lessens the attacks af these insects. Access to a piece of summer fallow where the sheep can stamp and raise a dust also helps to discourage the tormentors. During the months of July, August and September sheep should, if at all possible, be kept on pastures free from trees or shrubbery of any kind.

Tapeworm.

The sheep is known to harbour more varieties of the tapeworm than any other of our domestic animals save the dog. Eight species are found, of which, however, by far the most common in America is that known as the *Tænia expansa*. This tapeworm varies in length from three to six yards, and from one-twenty-fifth of an inch in width at the head to one-half an inch at the tail. It is composed of segments, dull yellowish white in colour, and about one-fourth of an inch in length and a little more in breadth, any of which if picked up by another animal may grow into a mature tapeworm. Sheep suffering from tapeworm first show paleness of the skin and mucous membranes, accompanied by brittleness of the wool and rapid loss of condition, although the appetite may continue good or even excessive. This is followed by digestive disturbances, irregular cud and offensive breath, bloating, constipation or diarrhœa, the faeces being yellowish in colour and often containing segments of

the worm. The sufferer becomes more and more feeble, and unless prompt relief is afforded death soon follows, usually preceded by convulsions and violent diarrhœa. Fortunately tapeworm is not very difficult to eradicate. The sheep should be fasted for from twelve to twenty-four hours. An injection of warm water given a few minutes before will help to promote the rapid action of the medicine. The dose, 1 drachm of the oil of male shield fern in from 2 to 3 ounces of castor oil for a mature sheep, is best given when the sheep is standing and after a fast of twenty-four hours, and then most of the dose passes to the fourth stomach. Kamala in doses of from 1 to 1½ drachms in thick gruel or treacle, followed after three hours by from 3 to 4 ounces of castor oil, is also often effective. For small lambs one-fourth of these doses is sufficient, and as the size and age increases the dose may be given to suit. In drenching sheep the mouth should not be raised above the level of the eyes, lest part of the dose pass into the lungs. After being treated sheep should be shut up for at least thirty hours to prevent the segments of the worm expelled being scattered about and much ground being infected. Subsequently they should be put on fresh ground in order to avoid the risk of reinfection. Tapeworm is most common in wet years and in wet, muddy districts, and although the life history of the parasite is not fully known, it is probable that it finds its direct access to the sheep in its larval or cystic form by being taken up with the grass. Infected pastures should, therefore, be burned over, ploughed up if possible or top dressed with salt, nitrate of soda or gas lime. Droppings should, when practicable, be collected and carefully burned.

Gid.

Gid, Sturdy, or 'Turnsick' is caused by an encysted parasite, *cenurus cerebralis*, in the brain. This is the ovum of a species of tapeworm which infests dogs, foxes and wolves. The eggs pass out of these animals and infest the grass or water, in either case under favourable conditions, retaining their vitality for several weeks. The sheep swallowing these become infected. The young worms are hatched in the stomach and penetrate its walls, getting into the blood. Many of them becoming scattered through the muscular and other tissues suffer degeneration and perish. Those which reach the brain or spinal cord, which they do in about a week from the time they are swallowed, burrow in through the tissues until a suitable place for development is reached. In this stage many die, but such as survive form a small transparent bladder, gradually increasing in size from that of a pinhead to that of a hazel nut. On reaching the dimensions of the latter, which is generally about two months after infection, numerous new tapeworm heads, often many hundreds, are formed in each cyst, the latter continuing to grow until the death of the patient, frequently attaining the size of a walnut. This, which is known as the cystic form, is seen only in sheep whose brains contain but a few cysts, and is that which produces the symptoms of genuine gid or sturdy. Where the embryos in the brain are numerous, acute inflammation of that organ generally destroys the animal before the close of the first month after infection. The mortality is sometimes very large. The disease is most in evidence in wet seasons, moisture being necessary to preserve the fertility of the eggs after leaving the original canine host. For the same reason infection is more common in the spring and fall than in the summer or winter.

It is not until after the embryo has reached the brain that the symptoms of gid make their appearance. The first of these generally noticed is dullness, followed by wasting and disinclination to move. The head is carried low or drawn to one side, while impaired vision is a common feature; the animals sometimes become totally blind, while in other cases one eye only is affected. Squinting is frequently noticeable, or the eyes may be drawn backward and present a sunken appearance. The locomotive powers soon become affected, the animal losing control of one or more limbs and exhibiting, as the disease progresses, marked peculiarities of gait and action, these of course varying widely in different cases. As already stated, death is not

uncommon at this stage, being due to general brain inflammation and consequent functional derangements.

When, however, the patient survives this stage, which is only the case when the encysted parasites are few in number, the symptoms of turnsick usually begin to show themselves. The affected animal may travel for hours in a circle, sometimes following a regular track, while in other cases the circle becomes larger or smaller with each completed round. In the latter case the animal frequently concludes the performance for the time by turning as if on a pivot, until losing its balance it falls exhausted, only to recommence its eccentric movements when sufficient strength returns. It is sometimes possible to locate the exact seat of the cyst in the brain by a careful observation of the vagaries of the patient. When only one cyst exists the animal will, as a rule turn towards the side on which it is situated, but this is not an infallible guide, as it is not uncommon to have two or more cysts located in different parts of the brain. When, however, one cyst only exists, the rule above mentioned generally holds good, in which the case the eye on the opposite side is usually blind from amaurosis (glass eye). If the cyst is situated near the front of the brain the patient steps high and keeps the head drawn backward. If the cyst is in the posterior part of the brain the animal will either lose all power of movement or will turn towards the wind, holding the head high and well forward.

Skilled shepherds with long experience of the disease become very expert in locating the exact seat of the cysts, and some claim that when superficially situated the bone immediately over them becomes thin and softened. When the affected animal is valuable and the cyst can be located, the skull may be carefully trephined and the bladder and its contents removed. In ordinary cases the best plan is undoubtedly to slaughter the affected sheep and burn the head. If the latter is eaten by a dog, wolf or fox, the worm grows in this new host to maturity and produces eggs. This round is kept up. It is well also to rid the farm of dogs, or if this is impossible, to rid the dogs of tapeworms by giving them at least twice a year, after starving them for twenty-four hours, a full dose of some reliable vermifuge, such as kamala, areca nut or male fern, followed by a purgative. The dogs undergoing this treatment should be kept shut up and all material passed by them carefully burned or treated with quicklime. Inquiry recently made indicates that gid is almost unknown among Canadian sheep, but imported sheep, and especially imported dogs, should be closely watched for some time after arrival.

Acute Indigestion.

Acute indigestion in sheep frequently takes the form known as hoven or bloat, which consists of the fermentation of food and the consequent formation of gas in the first stomach or rumen. It is generally due to sudden change of food, and is most often seen when hungry sheep are turned into clover, rape or alfalfa, or allowed to have access to frozen turnip tops. Under such circumstances it not infrequently affects a considerable number of animals at once, in which event it is necessary to take prompt measures to avert heavy loss. If observed in the early stages a good remedy is half an ounce of hypo-sulphite of soda mixed with a drachm of ginger in ½ a pint of water, to be followed later, unless permanent and effective relief is obtained, by from 4 to 6 ounces of raw linseed oil, to which may be added ½ an ounce of turpentine.

If the distension is extreme the paunch may be tapped with a trocar and canula. This is done on the left side at a point midway between the point of the hip and the last rib, and a similar distance from the transverse process of the backbone, which may be felt towards the upper part of the paunch. It is necessary, especially in fat animals, to be careful in locating the seat of operation, as otherwise serious injury may result to one or other of the internal organs.. The wool should be carefully parted so as to avoid the carrying of strands into the wound to cause subsequent

irritation and suppuration. Every sheep owner should keep a trocar and canula where it can be found at a moment's notice. Where the proper instrument is not available it may, in an emergency, be better to risk puncturing in the paunch with a pocket knife rather than let the animal die unrelieved, but the practice cannot be recommended, inasmuch as when the paunch begins to collapse, some of its contents are almost certain to escape into the abdominal cavity unless the opening is protected by the canula.

Spasmodic Colic.

Spasmodic colic is an affection of a different nature, and although sometimes due to the causes mentioned as producing acute indigestion, is more apt to be produced by other dietetic errors such as the feeding of the lambs with cow's milk or changing them too suddenly and completely from a milk diet to solid food. It may also be induced both in lambs and in adult sheep, by acrid herbs or by an unusual diet. The pain should be relieved by the administration of an anodyne mixture such as a teaspoonful each of laudanum and sweets spirits of nitre, dissolved with a teaspoonful of ginger and two teaspoonfuls of baking soda in ½ a pint of water. It may be necessary to follow up with a dose of raw linseed oil in order to relieve the bowels and remove the irritant, for which purpose also injections of warm water will be found useful.

Constipation or Stretches.

Constipation is not uncommon in sheep that are kept on coarse dry feed. The name indicates the nature of the symptoms shown, and this condition can best be relieved by the administration of a cathartic. For this purpose 6 to 8 ounces of raw linseed oil, with from 2 to 4 drachms of turpentine, may be given. Injections are also recommended. The tendency to constipation is best combatted by the judicious feeding of roots and other succulent feed through the winter, when it is most frequently seen.

Inflammation of the Bowels.

Inflammation of the bowels, properly so called, is almost unknown in sheep, although as in horses there are many conditions which produce acute inflammatory action in some one or more of the internal organs, giving rise to the symptoms generally associated with the name given above. The symptoms presented are similar to those of colic, but much aggravated, violent and almost constant abdominal pain being present. The medicinal treatment is similar to that for colic, but larger doses of the anodyne mixture may be given and repeated at intervals of several hours should the pain continue. Relief may sometimes be afforded by the application of mustard to the abdomen. Treatment is frequently unsuccessful, but should be persisted in, as such attacks occasionally terminate in diarrhœa, which, after being allowed to continue for a reasonable length of time may be controlled by the administration of starch or flour gruel, to which made be added the whites of eggs and a little whisky or brandy.

Diarrhoea.

Diarrhœa is as a rule the result of bad management, overfeeding with succulent food, or an indigestible diet, such as unripe food or frozen grass—that caused by the latter being a very serious form. It may also be caused by a sudden change to a diet of roots, especially mangels, and is also observed among sheep turned for the first time on alkili lands, and in those having access to water strongly impregnated with

alkali. Treatment consists in removing, if possible, all the inciting causes and by changing the diet to dry feed of a simple character. It is sometimes best where the trouble is evidently due to an effort of nature to get rid of irritation, to assist the process by the administration of a mild laxative, and for this purpose a few ounces of castor oil may be given, combined with a drachm each of laudanum and ground ginger. Should the diarrhœa persist after this treatment, it may be combatted by the administration of starch or flour gruel, combined with whites of eggs and a little stimulant, should the need of the latter be indicated.

Wool Balls.

Wool balls in lambs' stomachs may cause considerable loss, particularly among long-wool breeds, if the habit of wool eating is persisted in for a sufficient length of time to allow of the formation of many of these peculiar concretions. Digestive troubles, a craving for salt or some constituent lacking in the food may cause the lambs to chew wool; biting the sides to get rid of ticks is a common cause, and for this reason lambs should be dipped together with the ewes after the latter are clipped. The loose wool should be cut from the ewe's udder to prevent it getting into the lambs' mouths when sucking. Confinement should be avoided. The flock should be turned out on a wide range if possible as soon as the habit is noticed, and the separation of the first offenders should be effected at once, as imitation is a frequent cause of spreading the trouble. Free access should be given to salt, phosphate of lime or bone meal. Linseed oil in appropriate doses may afford relief, but if much wool is swallowed the balls may block the small intestine and cause serious derangement of the digestive functions, followed by emaciation and even death.

Derangement of the Urinary Organs.

Many of the diseases affecting the kidneys and bladder of other species of animals are almost unknown to sheep, and when they do occur, being difficult of diagnosis, are seldom recognized and still less frequently successfully treated. Trouble is occasionally caused, especially in male animals, by the formation of calculi, which, however, seldom give rise to definite symptoms except when lodged in the urethra. In this situation they give rise to serious difficulty in passing urine, and are, in fact, the most frequent cause of what is known as 'stoppage of the water.' The formation of calculi is induced by the too free use of highly nitrogenous foods and those rich in sugar and phosphates. Among the articles of diet held by different authorities to be responsible are peas, beans, corn, mangels and new mown clover. The condition is also more frequent in limestone districts, especially where the water supply is strongly impregnated with lime salts. The affected sheep generally lies down, and on being made to rise gives a peculiar spinal jerk, followed in some cases by the passage of a few drops of water. He is very uneasy and restless, changing his position frequently, respiration is hurried, and often each breath is accompanied by a painful grunt. The urine passed is thick and cloudy; the appetite fails; fits of shivering follow, and unless relief is afforded the bladder ruptures or acute urine poisoning sets in, either of these conditions being rapidly fatal. When, as is not unfrequently the case, the obstruction is at or near the external opening of the urethra, relief can often be given by clipping away the wool, and removing the accumulation, which is often more of a sabulous mass than an actual stone. Often the urethra is simply blocked by a mass of sediment behind the worm-like appendage at the end of the tube, and in such cases when manipulation fails, the worm itself may be removed, thus affording relief. In all cases in which the obstruction is situated in front of the peculiar flexure of the urethra which characterizes that passage in sheep as well as in cattle, an effort should be made to secure its dislodgement by gentle massage, fomentations and the injection

of olive oil into the urethra. Actual incision into the urethra is difficult and dangerous, and should not be attempted by any one except a skilled operator, and even then only as a last resort. Medicinal treatment is of little value, although the administration of belladonna in doses of from ten to fifteen grains may occasionally assist in relieving the tension of the parts. Benefit sometimes follows the administration of a dose of physic, and in these cases Epsom salt is, for obvious reasons, the most suitable agent. The dose is, for a full grown sheep, about six ounces dissolved with a handful of salt and two drachms of ginger in at least a quart of warm water.

Abortion.

Abortion may be caused in different ways. Injuries sustained by crowding through doors, hooks from cattle, or chasing by dogs have caused many a ewe to give birth to an immature lamb, usually dead. Ergotized grain or hay, smutty grain or its straw, frozen turnips or beet tops and impure water are other sources of this trouble. Careful management, clean, sound food and pure water are the best preventives of sporadic abortion. Some of the symptoms are loss of appetite, dulness and desire on the part of the ewe to isolate herself from the flock. Generally abortion takes place before any symptoms are noticed, but it is occasionally necessary to remove the fœtus and placenta lest blood poisoning sets in. Both fœtus and afterbirth should in all cases be burned, and the uterus flushed out twice a day for several days with a three per cent solution of creolin in warm water.

Epizootic abortion is caused by a germ allied to the common moulds. It is contagious and spreads rapidly through a flock unless proper precautions are taken. An animal which has aborted should be at once removed from the flock, and the uterus injected with the creolin solution mentioned above. Fœtus, afterbirth, &c., should be burned, and the place where the main flock are kept should be thoroughly cleaned. All bedding should be burned and the floors covered with sawdust containing ten per cent by weight of crude carbolic acid. The walls and ceilings should be whitewashed with lime and carbolic acid in the proportion of one pound of commercial carbolic acid to each five gallons of lime wash. Rams that have served affected ewes should be disinfected by syringing into the sheath a five per cent solution of creolin, or a 1 to 1,000 solution of bi-chloride of mercury. For this purpose a fountain syringe is the most convenient instrument. Such rams should not be used again for breeding until a considerable time has elapsed.

Eversion of the Womb.

Some time after the birth of a lamb (usually a case of difficult parturition), a red bladder-like body may be seen protruding from the vulva. This is due generally to a weakened condition of the ewe, and consequently of the ligaments by which the womb is attached, and also the failure, owing to exhaustion, of the *os uteri* to close normally. It frequently follows the retention of the afterbirth, when the whole organ is ejected, together with the membranes. In such case the placenta should be separated at each cotyledon to prevent bleeding. After removing the placenta or after birth, the organ itself and the surrounding parts should be washed clean with a two per cent solution of creolin or carbolic acid. Next have an assistant place the ewe on her back and grasping her hind legs raise her hindquarters nearly a foot above the floor or ground. In this position the womb may be most easily returned. The operator should next flush out the womb with a pint of luke warm water in which a little powdered alum has been dissolved. The ewe should be tied up for a few days in a narrow stall by herself, with the bedding built up in such a way that her hind parts are about six inches higher than her front parts. If straining continues and does not yield to medicinal treatment, a simple truss may be applied in the manner

familiar to most shepherds. Stitching the vulva is not recommended, although it may be necessary when the attendant does not know how to make and apply the truss. In no case should more than two or three stiches be inserted.

Sore Teats.

Wet, cold weather and damp or wet quarters cause sore teats in ewes. Sometimes the lambs bite the teats because of a lack of milk to satisfy their appetites. Any good healing salve will prove beneficial. Equal parts of sweet oil and glycerine applied two or three times a day has given good results.

Caked Udder.

Swollen udder is a common ailment at lambing time and again when the lambs are weaned. The heaviest milkers are most subject to it. The majority of cases are traceable to neglect on the part of the shepherd. Heavy feeding before lambing time is a frequent cause; exposure to draughts or a wet bed are responsible for many bad cases. These are easily avoided. At weaning time, to prevent swelling, the ewes should be milked out for two or three successive mornings, and this should be continued in such as show any tendency to cake.

Inflammation of the Udder or Garget.

Inflammation of the udder or garget is a very serious condition, and not at all uncommon. It may follow caked udder or may be induced by exposure to cold and wet, particularly the latter, to bruises from the head of the lamb or from lying on stones or dry, lumpy soil. It occurs most frequently in wet seasons and occasionally causes the death of the ewe from mortification. Instances are on record where the specific contagious inflammation of the udder which affects cows, has been transmitted to ewes occupying the same quarters. In the treatment of severe cases of caked udder or of inflammation of that organ, it is advisable to administer about 4 ounces of Epsom salt dissolved in ½ a pint of warm water. Bathe the udder with water as warm as can be borne for at least half an hour, then dry thoroughly and rub well with an ointment composed of lard 8 parts, belladonna 1 part. Keep the ewe in comfortable quarters and repeat the local treatment as required. If any tendency to suppuration is observed, it is advisable to apply heat and moisture, and for this purpose a poultice of spent hops is very suitable, or the udder may be packed with clean woollen waste, saturated with hot water and kept in position with a cloth, preferably waterproof. Feed lightly on clover hay and warm bran mash and give chilled water to drink. As abscesses show signs of pointing they should be opened with a sharp knife and treated as indicated below.

Abcesses.

Abscesses in sheep are not uncommon, being, in these animals, easily induced by bruises and other comparatively slight causes. As soon as the presence of pus is definitely ascertained the abscesses should be opened and the cavity injected with a 2 per cent solution of carbolic in warm water. This should be repeated from time to time until the wound heals.

Goitre.

Goitre shows itself as an enlargement of the thyroid gland which is situated beneath the throat close to the head. Sheep of all ages are subject to it, but it is

most frequently seen in lambs, causing heavy loss. Authorities do not all agree as to the cause. It is considered hereditary, while it is also undoubtedly, in some cases, due to malnutrition, apparently arising from certain conditions of soil and water as yet imperfectly understood. Insufficient exercise, the mating of overfat rams and ewes, inbreeding and weakly constitutions are other causes given, but it is improbable that any of these produce it unless the local conditions are favourable to its development. Lambs afflicted with goitre are frequently born dead or die shortly afterwards.

Curative treatment for goitre is but little resorted to for the reasons that young animals seldom respond satisfactorily. Mature goitred sheep (which in no case should be bred from) are only slightly inconvenienced by the disease and may be readily fitted for the block. The most experienced sheep breeders avoid the use of a goitred ram, knowing well that he is likely to leave a stunted progeny. The safest plan is to breed only from sound stock, the ewes of which, during the season of pregnancy should be given ample opportunity for exercise, with a plentiful supply of plain and suitable food.

Catarrh.

Catarrh begins with frequent sneezing, a discharge of mucus from the nostrils, inflamed eyes and loss of appetite. If allowed to go on it may become malignant, in which case the lining membranes of the nasal passage, throat, and even the stomach and intestines may become affected. Death frequently results, while such animals as recover from attacks of this extreme nature are generally almost worthless. Simple catarrh may be due to infection, and its development is favoured by changes of temperature, exposure to cold rains or chilling winds or by confinement in a draughty or poorly ventilated building. Malignant catarrh is seldom seen except when the conditions are unsanitary. Strong, vigorous sheep in good condition are less liable to seizure, and if attacked, are easier to treat and make a better recovery.

The first treatment (which it is advisable to try before the symptoms appear) is to place the animals in a clean airy place, dry underfoot and with good shelter easily accessible. When a nasal discharge is observed, flax-seed tea may be given three times a day, with plenty of good food. Warm mashes are beneficial, while in bad cases marked relief is afforded by steaming the head with hot water in which a little carbolic acid has been dissolved. Some rather ancient authorities recommend blowing different mixtures into the sheep's nostrils, but little benefit is likely to result from treatment of this kind.

Soreness of the Eyes.

Sore eyes may be due to enzootic opthalmia or to constitutional causes. Serious irritation is often induced by the entry of dust or chaff into the eye. Exposure to severe weather or draughts, or a continued heating diet occasionally causes more or less severe inflammation of the eyes. Lambs are not infrequently affected, and in them, as in fact in all severe cases, the tendency is to lose flesh rapidly. Treatment consists in examining the eye for foreign bodies, which, if present should be removed if possible. A little cocaine solution, which can be procured from any druggist, is especially convenient in dealing with this sensitive organ. In this, as in all other cases, the eyes should be well bathed in warm water, after which a solution of 2 grains of sulphate of zinc to 1 ounce of water should be introduced with an ordinary dropper or a small glass syringe. A mild laxative or at least a laxative diet is to be recommended and it is well to protect the eyes from exposure to strong light.

Enzootic opthalmia is, of course, contagious, and for this reason it is advisable to isolate at once any sheep having sore eyes, except of course those in which, on examination, the trouble is found to be due to the entrance of some foreign body or other well defined local cause.

THE CANADIAN WOOL INDUSTRY

Sheep raising in Canada is carried on more for the production of mutton than of wool. That is to say the first object of the Canadian sheep raiser is to produce mutton, and secondly to get what he can without special care for his annual crop of wool. In this respect the sheep raising conditions in Canada do not differ materially from those in other parts of the world where advanced agriculture is carried on. Simple wool growing cannot be maintained in any country where land has any considerable value. As civilization has advanced and the processes of agriculture have improved, one country after another has ceased to grow wool for itself alone; mutton has become the principal and wool the secondary object of the business. This change was effected in England first by improvement of the Leicester, the Southdown and the Hampshire. France by slow degrees transformed the Rambouillet Merino into a mutton breed of no mean quality. Australia and also New Zealand are mutton shipping countries, and the United States is rapidly getting away from the fine-woolled breeds to crosses of British varieties for the purpose of increasing the production of mutton. It is toward this end that Argentine breeders find it profitable to pay English breeders long prices for Lincoln rams, while the same motive prompts the demand from the ranges of the Western States for Canadian-bred long-woolled males.

Canada, of late years, has been giving more attention to wool production and wool marketing. True, the foundation stocks of the Western Provinces show an improvement in the direction of the mutton side, with a corresponding tendency towards coarser wool. Practically all Canadian wool is of excellent quality, as compared with its own class from other countries and the grading of Canadian wools, which was started in 1913 and has since developed into a national policy, has given Canadian wools an excellent standing, not only with our own mills, but also in the wool markets of the world.

The Annual Crop.

The estimated sheep population and wool production for Canada since 1915 is as follows:

Year	Sheep	Production of wool (lb)
1915	2,038,662	12,000,000
1916	2,022,941	12,000,000
1917	2,369,358	12,000,000
1918	3,052,748	20,000,000
1919	3,421,958	20,000,000
1920	3,720,783	24,000,000
1921	3,675,860	21,251,000
1922	3,262,626	18,523,392
1923	2,755,273	15,539,416

These figures represent grease wool weights. At the present time practically all wool is sold in the fleece, the old practices of river and tub washing having been discontinued almost entirely, due largely to the inception of grading and sale on a graded basis.

x Monthly Bulletin of Agricultural Statistics.

Apart from the range wool, which contains more or less Merino character, Canadian wool ranges from medium clothing to coarse combing, varying in proportion to the prevailing breeds. On the evidence of the most extensive dealers and manufacturers the finest grades, outside of the provinces of Saskatchewan and Alberta, are found in the maritime provinces, the Eastern Townships of Quebec, the Ottawa valley and in British Columbia. Even the common or unimproved flocks of these districts produce a relatively fine grade of wool, while the improved flocks possess more of Down than of long-wool character. In addition to this the soil and the climate of the sections referred to, more especially the maritime provinces, appear to exert a favourable influence on the wool as regards softness of texture and working quality. In these sections fully 60 per cent of the clip is classed as combing wool of the finer grades, whereas in the crop shorn in central and western Ontario, Manitoba and parts of Quebec the proportion of long and low combing wool reaches quite well up to 50 per cent of the clip.

As already indicated, the great bulk of the wool grown on the ranches of Saskatchewan and Alberta occupies a class of its own among Canadian wools. The yearly clip approaching 1,000,000 pounds in the grease, representing from 400,000 to 500,000 pounds of scoured wool, is classed as fine medium. That is to say it is finer than the finest grown in other provinces and coarser than the fine wools clipped from Merino sheep in South Africa, South America and Australia, of which large quantities are imported into Canada each year. It is the regret of the woollen manufacturer that this wool is each year growing coarser, the result of additional mutton crosses upon the Merino stock originally brought from Montana.

The Export Trade.

The United States has always been the chief outside market for Canadian wool. Great Britain takes a small quantity each year, and a few small shipments are occasionally made to Newfoundland. The annual exports to the United States for the past thirty years have usually been above the million pounds mark; less than half a dozen times it has fallen below the million,and in twice that number of yearly periods it has exceeded the two million mark. In 1855, 3,550,000 pounds crossed the United States boundary, while during the three years commencing 1895 the export ran up to 5,449,955, 3,851,432, and 7,499,949 pounds, respectively. The great increase during these years was due to the withdrawal of the customs duty on wool entering the United States as a condition of the Wilson-Gorman tariff. The year later (1898), when the tariff had been restored, the amount fell to about 1,000,000 pounds, and in 1899 to some 22,000 pounds. Since then it has been fairly constant, running from a little under 1,000,000 to about 2,250,000 pounds.

Practically only one class of wool goes from Canada to the United States—combing wool of a length of five inches and upwards, washed on the sheep's back. The United States market does not want clothing wool or pulled wool from outside, and their tariffs have been framed accordingly. In this respect a preference is shown wools classed as Cotswold, Leicester and Lincoln, on which the tariff is 12 cents per pound. In order to admit of classification the wool must be presented in individual fleeces and since the seller could not afford to pay duty on dirt, all our wool going to the United States must be washed before being shorn. An extensive Canadian buyer who secures a good share of the clip from Western Ontario gave the writer the following figures as representing the classification of an average lot of 15,000 pounds: Combing (Leicester, Lincoln and Cotswold) 10,500 pounds; clothing (Down and similar wool) 3,300 pounds; unwashed 600 pounds; rejects (cotted, unduly coarse, dead, filthy, &c.) 650 pounds. The first of these classes is in very limited demand in

Canada and goes chiefly to the United States, the others are practically all used up in Canadian mills.

Owing to the Fordney Tariff Bill passed in 1921, the export of Canadian wools to the United States has greatly declined and exports to Britain are likely to increase depending, of course, on the relative values of wool in Canada and Great Britain.

The exports to Great Britain have only once exceeded half a million pounds in one year (1879), when 640,000 pounds were shipped. Prior to 1887, fairly large shipments were made each year, but from that year until 1895 little or no Canadian wool found its way to Great Britain. Since that time the exports have increased, the quantity for 1906 being 200,039 pounds, and for 1910, 517,154 pounds. In 1924 the bulk of Canadian wool exports were made to Britain and as long as the present United States tariff is maintained the bulk of Canada's surplus wool is likely to find a market in Britain.

Domestic Consumption.

The comparatively small export of wool leaves about 10,000,000 pounds of shorn crop for domestic use. It is impossible to properly estimate the quantity that is still worked up on the farm. In New Brunswick, Quebec and to some slight extent in the other provinces, home carding and spinning are still in vogue, and no doubt considerable wool is used in the homes for making mattresses, quilts, &c. The quantities used in these ways are year by year decreasing, thus augmenting the supply to be taken care of in the mills. In addition to 8,000,000 to 9,000,000 pounds of home grown wool consumed in the Canadian mills large quantities of imported wools are brought in each year. For the years ending March 31, 1908, 1909, and 1910, the quantities imported were respectively as follows: 6,129,216, 5,683,948 and 7,427,079 pounds. These wools, with slight exception, are said to consist of fine Merino qualities such as are not grown in Canada, and are required in the manufacture of fine goods, such as flannels, fine tweeds, meltons, beavers, whipcords, covert cloth and fine rugs. These wools also enter very largely into the manufacture of underwear and other fine knitted goods.

The mills using Canadian wools manufacture such staple lines as blankets mackinaws, friezes, etoffs, tweeds, homespuns, sweaters, yarns, &c., each of which fills a large place in the requirements of the ever increasing population. Many of the smaller mills depending upon the local wool supply use Canadian wools almost exclusively. These manufacture several lines of goods, and in this way consume the different grades of wool produced. With few exceptions, what may be termed the large mills, import most of their wool and mix with it a little Canadian and a certain proportion of shoddy and of cotton.

That there will always be a strong demand for the substantial goods made from the finer grades of Canadian wool admits of no argument. Their wearing qualities appeal to the rural dweller and the more frugal of the urban population. Just now the fashions in both men's and women's clothing call for a fine fabric presenting a smooth surface. These are made from Cape, Australian and other Merino wools, and in the cheaper grades shoddy and cotton are very largely utilized. Sooner or later, however, the fashions will change and the coarser fabrics will command the attention of the purchasing public. The reversion to Canadian wool goods will be hastened by reason of the short life of the composite cloth, which soon shows wear on the exposed parts. Cloths carrying a high percentags of shoddy and cotton soon lose shape. It is this peculiarity of the popular clothing that gives much work to the numerous repair shops and pressing wardrobes that are springing up in every town and city. It is safe to predict that the fashion in men's clothes, more especially business suits, will revert toward the tweeds such as are readily made in Canadian mills from Canadian wools, replacing the smooth imported worsteds now so generally worn.

Wool Grading and Marketing.

The grading of Canadian wools was started by the Dominion Live Stock Branch in 1913. At this time the care taken in the growing, shearing, preparation for market and marketing was such that Canadian wools were discredited not only in the home market but in foreign markets as well. Graded wool easily sold at higher values than ungraded wool and on this account grading became very popular in a short time. At first, wool grading was performed locally, often at a number of points within a province. These grading centres not only acted as marketing points for graded wools, but also served as an excellent medium for farmers in ascertaining the relative market values of the various wool grades and the necessity of putting the wool up in proper shape for market.

When once the local organization work had been completed, and a knowledge of the wool grading principle became general among sheep raisers, it was thought best to establish the co-operative marketing and sale of wool on a purely commercial basis, and in 1918 representatives of the various associations met in conference and organized the Canadian Co-operative Wool Growers, Limited, an organization with which are now affiliated some thirty local wool growers' associations. The Canadian Co-operative Wool Growers, Limited, 217 Bay St., Toronto, now acts in co-operation with the various associations in arranging for the collecting and forwarding of wools consigned for grading and co-operative sale. They also act as selling agents for such wools for all the associations affiliated with them. The Dominion Live Stock Branch still assumes responsibility for the wool grade standards and provides official wool graders for the grading of co-operative shipments.

Defects of Canadian Wool.

Lack of Uniformity

Canadian wool, as compared with that grown in countries devoted largely to sheep raising, and where the climate is never severe, presents defects that are complained of by every wool dealer and manufacturer. The very general lack of uniformity in breed naturally gives a mixture to the character of the wool. This presents a difficulty to the manufacturer of special lines who desires to purchase a large quantity of one class. He is now compelled to purchase more or less mixed lots and pay men at his mill to re-sort them. This defect will continue until we so increase our sheep stocks that extensive Canadian wool markets are developed to better classify and take care of the output. To indicate the insignificance of the Canadian wool crop of some 12,000,000 pounds of shorn wool and upwords of 1,000,000 pounds of pulled wool it may be compared with the annual yield in Great Britain of some 130,000,000 pounds, to which may be added 700,000,000 pounds imported into that comparatively small area each year. Of these combined quantities about 543,000,000 pounds are consumed in Great Britain, the remaining 316,000,000 pounds being exported. The wool industry of Great Britain is a definite one of first importance, commanding the attention of both the manufacturer and the grower wherever he may be situated. So well are the London wool sales organized that one can buy almost any quality desired from samples secured by mail or by personal examination of offerings. When sales are in progress the different lots are classified and catalogued. Buyers are allowed to examine the offerings in the forenoons from gashes made in the bales. In the afternoon when the sales are in progress purchases are intelligently made by reference to the catalogue marked in the morning.

Chaff, Burrs, Etc.

The presence of foreign matter such as chaff, hay seeds, burrs, &c., in most Canadian wool detracts very largely from its value. Unfortunately our long Canadian winters, necessitating housing and the feeding of dry fodder, are responsible for much of the vegetable matter found in our wool. In addition, too many sheep raisers are not careful to clean their farms of burrs, with the result that the fleeces become badly infested with each recurring autumn.

The losses from the presence of vegetable matter are very large and assuredly come out of the wool grower. Such matter is removable only by expensive machinery or a process known as carbonizing. In the process of combing most of the chaff, &c., is removed, but for carding carbonizing is frequently necessary. This process consists of treating in an acid bath and raising the temperature to about 220 degrees, holding it there for sufficient time to reduce all vegetable matter to dust, which is shaken out by a special process. According to some authorities carbonizing greatly weakens the wool and renders it harsh, while others claim that the fibre is only slightly damaged. At any rate the process is expensive and the wool grower pays the bill. The use of properly constructed racks, careful feeding, shearing on a clean surface and the protection of the sheep from burrs would go a long way towards increasing the value of Canadian wool.

Cotted Wool.

Wool buyers and mill owners that purchase direct from growers and country storekeepers, complain of the presence of much cotted wool in each year's crop. One dealer estimates the amount at 6 per cent of the clip, while others place the proportion lower. This defect is most general in back country wool and is seldom found in lots from districts where the system of agriculture is well advanced. It is confined to the long-woolled breeds and grades of these, and is never seen in Down wool.

Cotting is believed to be due to several causes. Some sheep have a tendency to produce cotted wool; again neglect of proper shelter in bad weather, improper or insufficient feeding, extreme change of temperature, ill health, second growth, &c., are all blamed for the cotting of wool. These conditions can practically all be guarded against in the breeding and care of the flock. Cotted wool is of very little value as it can be used in only the cheapest of goods.

Second Growth.

A second growth of wool lessens the value of the fleece. It is due to late shearing. It is natural for the sheep to lose its wool each spring, and nature makes an effort in that direction. If shearing is delayed after the beginning of warm weather the fibres tend to separate at the body and a new growth commences which pushes its way up into the fleece. The presence of any short wool in a mature fleece is troublesome to the manufacturer, and, therefore, reduces its value. Shearing should therefore not be delayed after warm weather sets in.

Tying With Binder Twine.

With one accord dealers and manufacturers proclaim against the tying up of fleeces with binder twine. The following quotation from a reliable wool journal expresses the objection to this practice, which is not so common as it was a few years ago:—

'Again the growers of fleece wools are admonished not to tie wool with sisal or binder twine. Manufacturers and dealers are up in arms against this practice, and the manufacturer is more and more refusing to accept from the dealer wool tied with

sisal or binder twine, and the time has come when the buyers of wool must discriminate against this kind of twine. In untying the fleeces, it is impossible to remove this kind of twine without leaving some of the fibres in the wool. This causes a defect in the goods when made, to the annoyance and loss of the manufacturer, who has to put such piece of goods into his seconds. It leaves white or yellow streaks throughout the goods, as it will not take any dye. A farmer buying a piece of woollen goods, either black or coloured, would hardly accept a piece streaked with white or yellow, A farmer who insists on tying up his wool with binder twine will run the risk of having it rejected altogether, or be obliged to stand a reduction of several cents a pound. Wool should be tied with small, hard twine that will not rub off.'

Range Wools.

A wide difference of opinion prevails among manufacturers and dealers in regard to Canadian range wools. A number hold a rather poor opinion of them, while others find them quite satisfactory for the manufacture of the medium fine tweeds, flannels, fine blankets and underwear. After summing up the various opinions the writer concludes that these wools differ widely according to the character of the sheep from which they are shorn and the care given to them, especially during the winter and spring, as well as the grading and general care given the wool after it has been shorn. It appears to be perfectly true that much of our range wool lacks uniformity in quality according to the breeding of the bands. The original stocks were very largely Merino, but all the grading has been in the direction of mutton. The character of the wool, therefore, differs according to the number and breed of mutton crosses in the shorn sheep. A long wool cross produces a coarser wool than a Down cross, and so on from year to year and from cross to cross.

Again, a great deal of complaint is expressed with regard to the strength of fleece as well as the presence of coarse fibres known as 'kemp' throughout the fleece. An investigation of this charge brought out the fact that the conditions complained of exist in the product of careless ranchers, while the wool raised on and shipped from well managed range flocks is not only uniform and strong in fibre, but almost or quite free from kemp. It is a well understood fact that if a sheep suffers from illness, shortage of food, or hardship of any kind producing an unthrifty condition, the wool ceases to grow during that period. It not only ceases to grow, but a weak place known as 'break' is produced at that point. The 'break' in range wool is believed to be caused by the periods of severe weather and shortage of feed experienced to a greater or less degree each winter or spring. The wool produced on ranges that supply food and shelter from storms and severe cold does not show that tenderness complained of by certain manufacturers.

That other defect 'kemp' is by many considered evidence of a more or less remote cross of a breed naturally prone to produce these stout hairs in their fleece. The old Mexican, as also the Welsh sheep, had this tendency. Again, exposure to severe weather causes an extra growth of stout hair, and in the case of sheep, tends to kill the fibre. While true kemp and dead hairs may not be strictly identical they are about equally objectionable and are present in a proportion of our range wool. The extra growth is a provision of nature to fortify an animal against suffering. This is strikingly exemplified in the cases of horses and cattle, which when allowed to run out all winter produce long, coarse coats, whereas the same animals warmly housed remain sleek and smooth.

The presence of kemp greatly reduces the value of a fleece. The long stout hairs break readily and have another serious defect in not taking the dye well and, therefore, show up strongly in the manufactured fabrics. The precautions against kemp are practically the same as against 'break,' although it is advisable also to cull out such ewes as are noticed to produce kemp in their fleeces.

One of the features objected to by eastern mills and warehouses is the lack of

proper grading. This prevents mills buying direct from growers, while dealers will pay only a low price for it in order to recoup themselves from loss on low grade lots, Better grading before shipment east would establish a confidence between grower and buyer that would increase the price of these wools at the range.

Certain ranches have established reputations for good wool, well put up, and the secret lies in the principles adopted in their management. Sheds are provided to protect the sheep during storms and a good supply of fodder is put up for winter feeding. These precautions insure continuous thrift of the bands and consequently healthy wool. Their methods of grading the wool are good. Each fleece is rolled up separately and each class kept by itself. These are: 1st, shearling; 2nd, ewes and wethers over one year old; and 3rd, rams. A fourth grade consists of tag locks, pickings and dead wool. Each grade is properly labelled and baled or put up in sacks. Firms which are known to produce good wool and handle it as described receive a higher price than the haphazard wool grower.

On account of the long haul it is important that the wool be put up in bales or in very substantial sacks. Either process is satisfactory, provided it is very carefully done. The baling is usually done by a hay press or similar machine. The bales ranging in weight from 250 to 300 pounds, are bound with wire, and then covered with cheap sacking. Even though the sacks are torn during transportation the wool suffers no injury. Sacking is as satisfactory provided sufficiently strong material is used; a sack not less than 3¼ pounds will usually deliver the wool in good condition. The wool from the largest and best managed ranges is usually shipped in bales.

Pulled Wool.

In addition to the shorn wool, amounting to upwards of 14,000,000 pounds annually, there is also produced in Canada a large quantity of wool taken from pelts of slaughtered sheep and known as 'pulled' wool. The quantity from year to year usually exceeds 1,000,000 pounds washed, reaching 1,500,000 pounds in some years, the variation depending upon the export of pelts, which some seasons reaches 250,000. These are pulled in the United States and thus swell our exports of wool to that country.

Throughout the Dominion there are about a dozen wool-pulling firms. These people buy the skins, wash or brush them, strip off the wool, which is sorted in the pulling into several classes called for by the trade. The average weight of wool per hide is about three pounds washed, the quantity varying according to the breed of the sheep and the season at which it is slaughtered.

Pulled wool is the most easily sorted, as the pullers quickly detect the different qualities which are thrown each by itself as follows: Lamb's extra, super, combing, low grade, called No. 1; and burr clipped. Each class is adaptable to a certain purpose, and varies in value accordingly. Most of the short wool, 1 and 1½ to 3 inches taken from sheep and lambs slaughtered from June to October, goes into the knitting trade for underwear and similar lines. Our finest underwear, however, is practically all manufactured from imported wools of the Merino class. Some of our largest knitting firms use fully 90 per cent of imported wools, while others making a heavier, coarser line of underwear and socks, use as high as 80 per cent of Canadian wool. It might be pointed out that Canadian made underwear bears an excellent reputation and is able to hold its own against even the finest imported lines. For this reason our knitting mills are doing a flourishing trade, whereas our cloth mills are not so prosperous. The longer grades go into the clothing and combing classes, respectively, similar to shorn wool.

A very common defect complained of by wool pullers is the presence of burrs. These have to be clipped out by hand at a cost of from 1 cent to 5 cents per hide before the pulling is commenced. Apart from the expense of the labour the wool is much injured, especially if it be lamb's wool, which is of the greatest value. In the

opinion of the pullers the sheep raisers are not altogether to blame for this defect. It frequently happens that the damage is done after the sheep leave the farm. It is not uncommon for dealers and butchers to collect and hold sheep for days or weeks in pastures, not unfrequently vacant lots, that are more than likely to be infested with burrs. It is here that many, but not all, of the burrs are gathered in the fleeces.

Shearing.

The date of shearing has much to do with the quality and condition of the fleece. Sheep not clipped until the weather is warm will rub off considerable wool, because they are too warm. They also collect much dirt of one sort or other. Sheep should be shorn while the weather is quite cool, cold some would call it. A better fleece is secured, the sheep do better afterwards as they do not suffer from the heat and ticks, and there is no wool to bother the lambs while sucking or to form deadly balls in their stomachs.

Sheep should be shorn on a clean, dry floor. The fleece should be carefully trimmed either before or after shearing. Stained locks or tags should be put in a separate pile to be properly cleansed before offering for sale. The fleece should be folded neatly, skin side out, and tied with sufficient twisted wool or 'wool twine' to hold it together. Afterwards it can be put into sacks or bales.

In shearing, the shears or clippers should be held close to the body and not allowed to run off at a tangent, cutting the staple into two or more pieces, thus seriously injuring much good wool.

The Outlook.

In the future as in the past, wool will have its ups and downs, and like all other necessities, it will rise and fall in value according to the purchasing power of the people and the caprice of fashion.

The Canadian sheep man need have no fears for the future of the wool side of the business, provided he takes precautions to produce healthy, clean wool and gives attention to the culling out of the bad-fleeced breeding stock. The conditions necessary to produce high class mutton are favourable to the growth of sound fleeces. Canadian mills favour the Down wools, while the United States market takes care of the long wools, but each requires a sound staple as clean as possible from burrs, chaff, and other vegetable matter. Mutton will continue to be the chief aim of the Canadian sheep raiser, but the wool side is not to be despised and will increase the revenue from his flocks according to the condition of each season's clip