THE SHEEP INDUSTRY


SHEEP HUSBANDRY is one of the most important, as well as one of the oldest, of the world’s agricultural enterprises. Wool ranks next to cotton in importance among the fibers and has played probably a more important part than cotton in the spread of civilization. The wearing of clothes made from wool, which is a nonconductor of heat and does not readily absorb moisture, has made it possible for man to withstand the rigorous winters that prevail over much of the earth’s surface. The present world production of wool is only about 2 pounds per capita. As most of the people living within the Tropics use but little of this commodity, the supply available to the people living in the colder regions is somewhat larger. The American people are among the heaviest users of wool, the annual per capita quantity being over 5 pounds.

From the dawn of history the flesh of sheep has been an important item of food for man. Lamb and mutton are among the most healthful, nutritious, and palatable of meats. However, the consumption of these meats varies widely in different countries. In the United States the average annual per capita consumption of lamb and mutton for the 10-year period 1912–1921 was 6.2 pounds; Canada in 1910 averaged 9 pounds; the United Kingdom in the period 1895–1908 averaged 26.7 pounds; France in 1904 consumed 9 pounds per person, and Germany in 1904–1913 only 2.2 pounds per year. In the respective periods mentioned the consumption of lamb and mutton constituted the following percentages of the total meat consumption: 4.35 per cent for the United States, 5.57 for Canada, 22.25 for the United Kingdom, 11.25 for France, and only 1.91 per cent for Germany.

Sheep raising has always been one of the world’s leading pioneer enterprises. In the past, sheep kept primarily for the production
The leading sheep-producing countries are Australia, Russia, Argentina, United States, India, Union of South Africa, United Kingdom, and New Zealand. The distribution of sheep in Russia and the United States is less dense than in the other countries. Four of the six densest centers of sheep raising—Australia, the Argentine-Uruguay area, the Union of South Africa, and New Zealand—are in the Southern Hemisphere. These are relatively new lands with sparse population. In the Mediterranean countries topography and climate favor the sheep industry, which is seminomadic in character. In Great Britain the large area of pasture makes mutton and wool production a prominent industry in spite of dense population and high-priced land.
TREND IN NUMBER OF SHEEP IN IMPORTANT COUNTRIES.

Fig. 2.—In Australia, the greatest sheep-producing country of the world, the number of sheep increased very rapidly from 1860 to 1890. Since 1890 wheat production and cattle raising have been displacing sheep. The sheep industry of Argentina is, likewise, giving way to grain production and cattle raising. New Zealand continued to increase its number of sheep until quite recently, but dairying may soon check further growth of the sheep industry. Russia maintained a large number of sheep before the war, and there is a vast territory in Siberia and eastern Russia presumably suitable for sheep raising. The United Kingdom, despite its dense population, still maintains an important sheep industry.
of wool have been raised very cheaply in regions remote from civil-
ization because, owing to their herding instinct, they could be handled
in large bands, and wool could readily be transported for long dis-
tances without serious danger of spoilage and at relatively small
cost. Although the pioneer phase of the industry is passing, the
above factors, together with the adaptability of sheep to a wide
range of climatic conditions, their ability to go for several days and
even weeks without water when on succulent feed, as well as their
fondness for shrubby and weedy types of forage not consumed by
most domestic animals, make it possible to keep sheep in regions
that would otherwise be unutilized. This is especially true of the
arid regions.

In the United States sheep production is of special importance in
the grass-producing regions of the Eastern and Central States, par-
ticularly in rolling and hilly sections, in the more arid portions of the
West, in the rugged range territory adjacent to and including the
national forests, and in the fenced range area of southwestern Texas.
Sheep are fond of a great many varieties of weeds and underbrush
which cattle and horses do not relish; thus they are useful in keeping
fields and fence corners clean and in the utilization of farm and
range forage not so well adapted to other kinds of livestock. On
rugged pasture lands the flock of sheep will always be found on hills
or knolls during the hours of rest, so that most of the manure is left
in those parts of the field where it is most needed for the mainte-
nance of soil fertility.

World Distribution of Sheep.

Of the six densest areas of wool and mutton production four—
Australia, New Zealand, Argentina, and South Africa—are in the
Southern Hemisphere. The two remaining centers, the British Isles
and the Mediterranean region, are in the Northern Hemisphere
(fig. 1).

Australia is about the same size as the continental United States,
but has a much larger area that must be devoted to grazing purposes,
as the annual precipitation over three-fifths of the continent is less
than 15 inches. Sixty per cent of the land area is best adapted to
sheep raising. In the semiarid regions where the feed, because of its
weedy and shrubby character, is not suited to cattle, and where trans-
portation facilities are inadequate, Merino sheep, which are kept
primarily for the production of wool, prevail. In the farming re-

gions the crossbreds (sheep of the fine wool and mutton cross) are
very popular, and the growing of mutton for export trade is becom-
ing important. Australia now ranks third in mutton exportation.

As practically all the Crown lands (public lands) suitable for
grazing are leased for long periods and in areas sufficient for exten-
sive operation, the Australian flockmasters are on a much more
stable basis than are those of the western United States. Australia
is, however, subject to severe droughts, and occasionally very heavy
losses are sustained from which it usually takes several years to recu-
perate fully. In parts of the country rabbits are a serious pest, while
in other sections prickly pear is destroying much of the range.

New Zealand leads in the production of mutton, its exports aver-
ageing about 250,000,000 pounds annually. A luxurious growth of
The Sheep Industry.

forage, which is available for grazing purposes throughout the greater part of the year, covers most of the islands. Sheep raising has been the dominant industry in these islands since their settlement. The dairy industry, however, is becoming a strong competitor. The rapid rise in land values in recent years, together with the breaking up of large holdings, has given a great impetus to dairying and it has made a rapid growth.

Most of the New Zealand sheep are kept in regions where the rainfall is less than 50 inches. Considerable use, however, is being made of the western side of South Island, where the rainfall is very heavy, sheep from the east being driven through the mountain passes when the trails are opened in the spring. Sheep are encroaching also on the volcanic plains of the central part of North Island.

In Argentina the number of sheep has declined from a total of 80,000,000 head in 1880 to less than half that number in 1920 (fig. 2).

RELATION OF SHEEP TO POPULATION AND TO LAND AREA IN 11 IMPORTANT COUNTRIES.

<table>
<thead>
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<th>NUMBER OF SHEEP TO 100 INHABITANTS</th>
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<tr>
<td>COUNTRY</td>
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<tr>
<td>NUMBER</td>
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<tr>
<td>1776 NEW ZEALAND 215</td>
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<td>1433 AUSTRALIA 26</td>
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<td>770 URUGUAY 159</td>
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<td>458 UNION OF S. AFRICA 67</td>
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<td>410 ARGENTINA 31</td>
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<td>221 GREECE 139</td>
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<td>96 SPAIN 105</td>
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<td>58 YUGO SLAVIA 73</td>
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<tr>
<td>50 RUSSIAN EMPIRE (1910) 9</td>
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<td>48 GREAT BRITAIN 232</td>
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<td>34 UNITED STATES 12</td>
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Fig. 3.—The leading countries in the number of sheep for each 100 inhabitants are all in the Southern Hemisphere. These countries are sparsely populated. Great Britain, although densely populated, leads in the number of sheep per square mile. New Zealand standing next, the Balkan States, represented by Greece and Yugo-Slavia, rank high both in number of sheep per inhabitant and per square mile. Spain, the home of the Merino, similarly stands relatively high. Russia, which is second in the total number of sheep, and the United States, which ranks fourth, both have a relatively low number of sheep per inhabitant and per square mile.

For some time past cattle and grain farming have been forcing some of the sheep to the more arid regions to the south and west. The production of fine wool is now largely confined to the arid Provinces of southern Argentina. About 75 per cent of the total sheep in the country are of the mutton types. These mutton types of sheep still occupy a prominent place in the agricultural Provinces. In the Province of Buenos Aires, where nearly 50 per cent of the sheep are located, all of the sheep are of mutton breeding. Argentina stands next to New Zealand in the exportation of frozen mutton.

In British South Africa, except for the coast areas, the rainfall is low and prolonged droughts are common. Most of the rain occurs during the summer, the winter being very dry, especially over much of the plateau area of the interior. For this reason, most of the
land is best suited to grazing purposes and primarily to the production of wool. Practically all of the good land has been under private ownership for many years. The Crown lands are barren areas which, for lack of water, are not capable of carrying stock. Large areas of this land could be made available for sheep grazing by providing watering places and by irrigation. The Merino is the dominant breed.

The United Kingdom is one of the few countries of dense population where sheep still persist (fig. 3). The moist, mild climate is favorable to the production of a luxurious growth of grass, and, as the winters are mild, stock can be grazed most of the year. The agriculture of the islands is largely pastoral, and sheep have occupied a prominent place since a very early date. As the English people have always consumed large quantities of mutton, especial emphasis has been given to the development of mutton types of sheep, this country being the home of the mutton breeds. For many years England sent a constant stream of improved breeding sheep of the mutton type to all parts of the world. Recently there has been a small decline in the number of sheep. They are apparently being displaced by dairy cows needed in the production of milk for urban use.

Although Spain does not stand high in the total number of sheep, it deserves mention because it was the original home of the fine-wool breeds. About the year 1500 Spain and England were the leading sheep countries of the world. Sheep still occupy a prominent place in Spanish agriculture, and the growers still possess grazing rights granted in medieval times. Compelled to migrate from the hot, dry, lowland pastures into the northern mountains each spring to obtain summer grazing, the Merino developed into a very hardy breed with fine quality of fleece, but with poor mutton qualities. The adaptability of this breed to dry, remote range has been an important factor in the demand for Merino blood in newly settled countries.

In the Balkan States and in Asia Minor the arid or semiarid plains and mountain highlands, as well as the more or less nomadic habits of the people, have caused sheep and wool production to occupy an important place among the rural industries.

Russia stands second in total number of sheep, but relatively low in the number per square mile and per capita of population. Little is known concerning the present situation of the sheep industry in that country.

The United States ranks fourth in total number of sheep, but, like Russia, the country taken as a whole stands relatively low in the number of sheep per square mile and per inhabitant. There are, however, areas of dense concentration of sheep, as in the fine-wool section of Ohio, and in portions of the western intermountain region.

Development of the Sheep Industry in the United States.

Sheep were introduced into Virginia in 1609, into Massachusetts about 1630, and are reported to have been introduced into the other Colonies soon after they were founded. Conditions in the Colonies were not favorable for rapid increase in the number of sheep. Predatory animals, Indians, and severe winters made serious inroads on their numbers. At first the few sheep were kept within town
inclosures, or on islands or peninsulas fenced off from the mainland. Wherever sheep ran at large, herders were necessary to protect them. It was customary for one or more herders to take care of the flock of the entire settlement.

Sheep were important to the Colonies of the North as their source of clothing material. The wool was mostly worked up by the family that owned the sheep. Doubtless there was some trade in the wool, some families exchanging their surplus of wool with other families and some making clothing for exchange with others. There was no demand for mutton, except as meat for the family table. In the South cotton took the place of wool to a certain extent in the manufacture of clothing. In the North the sheep were so important that colonial governments did much to encourage the keeping of sheep.

During the eighteenth century the character of the American sheep remained unchanged. Sheep were kept primarily to supply the demand for wool for homespun clothing. In some communities more homespun was produced than was necessary to supply the local needs and the products of this industry entered into commerce to some extent, but there was practically no manufacture of woolen clothing outside the homes. The first woolen mill having more than one loom was established in Hartford, Conn., about 1788. Woolen clothing continued to be imported from England. During the Revolutionary War, when this supply was curtailed or cut off, there was a marked growth in the household industry. This gave a temporary impetus to the keeping of sheep. However, in 1800 the typical farm flock in New England contained from 10 to 20 sheep, which clipped about 2 pounds of coarse wool per head.

After the Revolution woolen goods of British manufacture again appeared on the colonial markets, but by the Embargo Act of December, 1807, and the Nonintercourse Act of 1809, this country again was thrown on its own resources in meeting the domestic demand for clothing. The number of woolen mills began to increase rapidly to supply the grades of clothing better than homespun, which hitherto had been imported. In 1810 it was estimated that there were about 7,000,000 sheep in the United States.

The almost complete stoppage of foreign commerce during the War of 1812 accelerated the growth of wool manufacturing and further increased the price of wool. Between 1810 and 1814 the number of sheep is estimated to have increased from 7,000,000 to 10,000,000 head. After the country reverted to a peace footing, in 1815, foreign manufacturers again flooded the American market with woolen goods. Most of the American factories soon shut down or operated but a part of the time for several years. These adverse conditions were accentuated by the panic of 1819, and the result was a severe depression in the sheep industry of the country.

Soon after 1820 the woolen industry began to improve, and by 1824 it was in a fairly prosperous condition. Although the factory production of coarse woolens had become important by 1830, the largest market for coarse wool still was the home manufacturer. At least half of the domestic wool clip was being used in the household. Poor transportation facilities were an important factor in maintaining the household manufacture of woolen clothing.
During the period from 1830 to 1887 the woolen mills doubled their output. A general application of power and the use of improved machinery greatly lowered the cost of the manufacture of cloth. The growth of cities rapidly increased the demand for the factory product. As transportation facilities improved, enabling the merchandise of the cities to be carried into the country, the home manufacture of clothing rapidly lost ground.

With the rapid development of wool manufacturing there was a change in the status of the sheep industry. Previously only small flocks had been necessary to supply the home needs for clothing. The factories, however, demanded large quantities of wool, and the prices paid by them induced many farmers to specialize in wool production, especially those farmers who lived in outlying districts.
The Sheep Industry.

Fig. 6.—Ohio, southwestern Pennsylvania, and southern Michigan constituted the most important sheep-producing region in 1880. The increase in numbers in the far West has been much greater than in the East. Two-fifths of the sheep are now west and southwest of the Missouri River. The decrease in New England and New York continues, whereas the number of sheep in Ohio, Michigan, and Wisconsin has increased.

Wool growing developed rapidly in western Massachusetts, Vermont, and New York in the thirties. It was undoubtedly stimulated by the high prices prevailing between 1830 and 1840. The industry along with other agricultural enterprises, however, suffered from the panic of 1837. The prices of wool began to decline about 1840.

The first accurate figures available relative to the number of sheep are those for 1840, when the census enumerated 19,000,000 head. The greatest center of sheep production was in Vermont. Western New York was also an important center of sheep raising. The industry as yet had not developed to any great extent west of the Alleghanies, although a beginning had been made in southwestern Pennsylvania and in eastern Ohio. (See fig. 4.)

Fig. 7.—In 1900 nearly three-fifths of the sheep were in the western range country. The increase in numbers in the Great Plains and intermountain regions since 1880 has been very great, but the industry began to decline in California and western Oregon soon after 1880. The number of sheep in New England and New York continues to decrease, and a decline has set in also in Ohio and Michigan.
Following 1840 there was a decline in the high prices of farm products that had prevailed during the late thirties. The growing of grain became for the time generally unprofitable throughout the Middle West, where the transportation charges to the East were very heavy. As wool, relative to its value, could be transported easily and cheaply, there was a rapid shifting of the sheep industry from the East to the West. Many sheep raisers moved their flocks from New England to Ohio and Michigan, and some drove on farther west. The sheep farmers remaining in the East reduced their flocks.

The eastern sheepmen also began to turn their attention to the production of mutton as well as wool, particularly after 1850. The change to the mutton type was most rapid near the cities. As the farmers selected and improved the mutton qualities of their sheep the demand for mutton increased. Instead of being a secondary consideration mutton soon became a determining factor in the selection and production of sheep in the East. By 1850 the center of wool production had shifted to the West, and Ohio had become the leading sheep raising State of the Union.

During the decade of 1850-1859, the sheep industry made little progress. In the East the dairy industry continued to displace sheep. However, the increase of the mutton breeds, especially for the production of early lambs, continued quite rapidly. Many mutton-type wethers were fed in the East during the winter to be marketed early in the spring. Sheep for winter feeding were driven east from Kentucky and south from eastern Canada, where mutton breeds were kept almost exclusively. In the West sheep husbandry met with severe competition from other farm enterprises, especially grain production, cattle, and hogs. With the opening up of the European markets shortly after 1845 a considerable export trade in grain developed. This, together with a rapid increase in transportation facilities and the reduction of shipping costs, made farming again profitable.

Where the land was level and easily brought under cultivation, the sheep industry did not succeed in holding its place on the frontier in competition with wheat, corn, cattle, and hogs. Consequently, sheep raising as a pioneer industry passed rapidly across the level prairies to the far West. Sheep have persisted, however, to the present day on the rough or uneven lands of eastern Ohio and southern Michigan. The first development in the far West was the growth of the industry from Texas and New Mexico northward. The sheep industry of New Mexico had been in existence since an early date. As early as 1700, sheep were driven from New Mexico to California. In the expansion of the western industry New Mexico was drawn upon for much of the foundation stock, which has been gradually improved by the introduction of Merino blood. As early as 1860 there were many sheep in both Texas and California (fig. 5).

The first effect of the Civil War was to increase the price of wool and stimulate the sheep industry. This increase in price was due to the demand for woolen goods for military use. Moreover, for a time the supply of cotton from the South was cut off and woolen goods had a monopoly of the clothing market. The number of sheep increased rapidly, not only in the newly developed agricultural regions but even in the old sheep-producing centers of the East.
The war had an opposite effect on hogs and dairying, and some of the producers of these products turned to the production of sheep.

The end of the war, however, caused a crisis in the sheep industry. A sharp decline in the price of wool followed shortly (1866) after the close of the war. With the end of the war cotton began to come back. Large stocks of Army woolens had been accumulated and were offered for sale. There was an oversupply of wool and woolen goods. To add to this situation there was a heavy influx of foreign wools in 1866. On the other hand, the prices of some other commodities improved relatively owing to the restoration of the southern markets. Eastern farmers again turned from sheep raising to other farm enterprises. Large numbers of sheep were driven westward. By 1870 the sheep industry in the Eastern States had declined to about the same condition as in 1860. There had been a great increase in the Southwest and far West. In these regions remote from markets sheep raising still continued to be the most profitable enterprise.

Following 1870 there was a rapid expansion in the far West, where free grazing could be obtained throughout the entire year, so that the only expense was for labor and supplies, and the only investment involved was in the sheep and a camp outfit. This western expansion of the sheep industry continued until most of the range country was overcrowded. The maximum number of range sheep seems to have been reached about 1884, at which time the number in California began to decline (fig. 6). In some sections, however, the maximum number was not reached until much later, Montana reaching its highest number in 1903. The year 1884 also marks the high point of the industry for the United States as a whole. There were reported to have been 50,627,000 sheep, exclusive of lambs, in that year. The decline in the number of western sheep has been due partly to deterioration of the range because of overstocking, but more largely to the settlement of vast areas of grazing lands for farming purposes.

During the period of greatest expansion of the western-range industry wool production also was expanding rapidly in other parts of the world, especially in Australia and Argentina. As it was generally impossible for eastern farmers to compete in wool production with either our West or those countries, most of them were compelled to give up sheep raising or to turn their attention to the production of mutton. The annual exports of wool from Australasia increased from an average of 148,000,000 pounds in the 10 years ended in 1870 to 647,000,000 pounds for the five years ended 1899. The production and exportation of wool from Argentina also increased very rapidly. The price of wool and the price of sheep fell steadily from 1870 to 1896.

By 1900 sheep raising in the East was largely confined to areas where, because of much rough land or soil conditions, most of the farm was kept in pasture, as in southwestern Pennsylvania, eastern Ohio, and portions of Kentucky, southern Michigan, and southern Iowa (fig. 7). Since that date the sheep industry has been subject to severe competition throughout the United States. In the East dairying has continued to make inroads upon the sheep industry, and in those sections of the West where dry farming is important, cattle have replaced sheep to a considerable extent (fig. 8).
The fattening of range sheep for market began in the western part of the Corn Belt and the region tributary to the big flour mills of Minnesota in the early eighties, and developed rapidly during that decade and the one following. At first the business was mostly in the hands of large operators who generally purchased all their feeds. A little later farmers began feeding sheep as a means of utilizing large quantities of roughage, and in the Corn Belt some of their surplus corn. This practice was greatly encouraged by the development of the great packing centers in the upper Mississippi Valley. The far West was shipping sheep to these packing centers, and it soon became evident that it was profitable to give some of these animals a “better finish” before they were slaughtered. In the early stages the sheep were almost wholly wethers. Later, as the demand for lamb increased and the numerous wethers, which were largely unprofitable, disappeared from the range, the feeders turned their attention to the fattening of lambs.

During the recent World War the demand for immense quantities of wool for military uses greatly stimulated the industry. Shortly after the close of the war the allied nations found that they had immense stocks of woolen goods on hand for which there was no further need, while the British and United States Governments also had accumulated large supplies of raw wool, most of which was of the coarser type. This heavy supply did not become burdensome until 1920, when, owing to a falling off in consumption, there was a break in the price of the coarser wools. This was soon followed by a sharp break in the price of all wools during the period of general deflation.

In the spring of 1921 many sheepmen found themselves with a clip of wool on hand, and some, who had held the 1920 clip for better prices, had two clips, for which there was virtually no market. Heavy importations of lambs from New Zealand at this time greatly

![Sheep on Farms and Ranges](image-url)
The Sheep Industry, 

depressed the lamb market. A large number of eastern growers, especially those who had taken up sheep production during the war, immediately liquidated their flocks, in some instances causing a severe congestion of mutton on the markets.

The western sheepmen were severely hit. A large percentage of these men had borrowed heavily in order to increase their flocks to war-time needs. The southwestern range men had just passed through a three-year drought period in which there had been heavy losses. The northern men had suffered from an unusually dry summer (1919) which was followed by a severe winter. As they were already in a very precarious condition, the calling of loans in 1920 resulted in many sheepmen being thrown into bankruptcy, while the majority of the remainder were for the most part obliged greatly to curtail

Fig. 9.—The decrease in the number of sheep in the United States is due to several factors. In the more densely populated farming sections the dairy cow has been steadily displacing sheep. The heavy decrease of range sheep in Montana and Wyoming is owing largely to the severe climatic conditions of 1917-1919, and to the rapid occupation of much of the range by homesteaders. In New Mexico a three years' drought (1916-1918) caused heavy liquidation. There was an increase of over 100 per cent in Texas. The number of sheep in Arkansas remained practically unchanged.

In the meantime foreign competition has diminished rather than increased. Other important sheep-raising countries have had experiences similar to that of the United States. Grain farming and cattle ranching are displacing sheep ranching in Argentina and Australia. There remains no important sheep-raising country, excepting possibly South Africa, in which it appears that the number of sheep will increase notably.

Improved Types of Sheep.

Early in the nineteenth century the demand for fine wool encouraged the development of Merino sheep in the United States. New England, particularly Vermont, became famous for the heavy-shearing, wrinkled type, for in those early days wool was para-
SHROPSHIRE RAM.

Fig. 10.—Shropshire sheep are popular for mutton and wool production on the farm. Shropshires constitute nearly one-third of all the purebred sheep in the country. They are widely distributed over the mutton-sheep-producing areas of the farm States. The northeastern quarter of the country contained three-fourths of all purebred Shropshires in 1920.

RAMBOUILLET RAM.

Fig. 11.—The Rambouillet is sometimes called French Merino, as the foundation of this breed was developed in large measure by the French Government at Rambouillet, France. It is a popular breed in fine-wool regions, both in the East and West, and is the dominating fine-wool breed of the western range. A large percentage of our crossbred range sheep are founded on the Rambouillet.
Hampshires are bred on both farm and range. Their robust vigor, plump mutton form, and early maturing qualities make them valuable for market-lamb production where feed is abundant. Hampshire rams are used extensively on the western range for mating with crossbred and fine-wool ewes for the production of market lambs to be sold for slaughter direct from the range.

Lincolns are large mutton-type sheep that produce heavy fleeces of long but rather coarse wool. The common practice on the range of mating Ramboilliet ewes with Lincoln rams results in a crossbred type especially valuable for mutton and wool production under range conditions, provided grazing forage is sufficiently abundant for the production of lambs.
mount and mutton a by-product. But as the century wore on manufacturing and population increased rapidly in the East, sheep moved westward and by the close of the nineteenth century a healthy demand for mutton had developed. Wool was then produced at less expense on the western range and the East attempted to meet this western competition by producing more mutton. However, the provision of transportation facilities throughout the country and the continued demand for mutton created the need for a mutton type in the western range country as well as in the farm States. Even fine-wool breeders are now striving for mutton development in the Delaine Merino and Rambouillet. Wool remains important, but mutton is now yielding as much of the returns as wool, and, in many of the farm States, it yields more.

Shropshires (fig. 10) are widely distributed in the farming sections of the North and West, but they are especially popular in the Corn Belt and Great Lakes regions. In 1920 the Middle Atlantic and North Central States reported 73 per cent of all the purebred Shropshires. Rambouillets (fig. 11) are bred successfully in some of the farm States, notably Ohio and Michigan, but they are more extensively produced in the West. The 12 far western range States reported 90 per cent of all the purebred Rambouillets. Merinos are bred most extensively in the Ohio fine-wool region. The States of Ohio, West Virginia, Pennsylvania and Michigan reported 56 per cent of all the purebred Merinos (chiefly Delaines), and Ohio alone reported 40 per cent of them. They are also bred to quite an extent in Oregon, California, New Mexico, and Texas. Hampshires (fig. 12) are found to some extent in New York, Pennsylvania, Michigan, Missouri, Virginia, and Kentucky, but 59 per cent of the purebred Hampshires were in the 12 western range States. Oxfords were most numerous in the North Central States; Lincolns (fig. 13) in the Mountain and Pacific States; Dorsets near hothouse-lamb mar-
kets in the Middle Atlantic and East North Central; Southdowns in Tennessee, Kentucky, West Virginia, Ohio, Pennsylvania, and New York; Cheviots in New York; Leicesters chiefly in the northeastern and North Central States; and Suffolks are scattered sparsely in both farm and range States.

As stated above, the Rambouillet has gained a strong foothold on the western range. Much has been accomplished in the development of the mutton tendencies together with the maintenance of heavyshearing qualities in this breed, and it has proved to be well adapted to hazardous range conditions. In those regions where range forage is sufficiently abundant to produce finished market lambs, Rambouillet and Delaine ewes have been bred to Lincoln and other long-wool rams for the production of lambs that mature for the market at an earlier age and with more pronounced mutton form than would be possible for the average fine-wool lambs. Moreover, the Lincoln-Rambouillet crossbreds and similar crosses yield heavy fleeces of comparatively light-shrinking wool. This wool is of medium fineness and sells to advantage. During the last 10 years a great deal has been done toward the establishment of this type. Work of this nature, conducted by the United States Sheep Experiment Station, Dubois, Idaho, has resulted in the development of what is known as the Columbia (fig. 16). This has been accomplished by mating Lincoln-Rambouillet crossbred ewes with rams of the same cross. The Corriedale, a similar type of crossbred, which was developed in New Zealand by crossing Lincoln rams on Merino ewes, is now considered an established breed. Some choice Corriedales have been imported into the United States since 1914 for use on western ranges. Another similar crossbred type known as the Panama, which was founded by crossing Lincoln ewes and Rambouillet rams, was
developed in south-central Idaho during the last decade. The use of Hampshire rams on crossbred and fine-wool range ewes has also been extensively practiced, especially in regions having an abundance of forage. Hampshire-sired lambs mature early and on the slaughter market they sell exceedingly well.

Karakul sheep were introduced from central Asia in recent years for the production of fancy furs in the form of lambskins. They are very few in number and their importation is expensive, but they seem to be adapted to a wide range of conditions, and Karakul lambskins have been in great demand.

Sheep Management.

Sheep management in the United States is divided into three distinct systems: (1) the keeping of small flocks on farms, (2) the running of sheep in large bands to utilize extensive range areas, and (3) the fattening of range sheep on irrigated and Corn-Belt farms.

Farm Flocks.

Eastern farm flocks are most frequently found in the hilly and mountainous regions where much of the land is too rough to farm and must be kept in pasture. In regions distant from large cities, sheep frequently form one of the major farm enterprises. In districts where dairying predominates, they are seldom kept except on farms having an excess of pasture. In the level areas, where most of the land is tilled, farm flocks are rather infrequent. With the ex-
ception of flocks that are kept for the production of purebred stock, it is seldom that any special crops are grown for the sheep. They are generally turned onto pasture as soon as the grass begins to grow in the spring and remain there until the crops have been harvested, when they are usually given the run of the fields to graze on aftermath and clean up the weeds, where they remain until snow comes. They are then carried through the winter on hay and some of the unsalable roughages, receiving little or no grain.

The sheep are kept primarily for the production of lambs, and are mostly of the mutton breeds, Shropshires predominating. Most of the lambs are born in the early spring when the pastures begin to grow, and are generally marketed in September and October, about the time the pastures begin to fail. There is a decided tendency to give the sheep insufficient care, with the result that many inferior lambs are produced. As inferior lambs are not readily salable, they are generally unprofitable to their owners. Furthermore, as the market is usually congested in these months, they seriously affect the price of the better-quality lambs that have been more carefully raised.

North Atlantic States.—Sheep farming at one time occupied an important place in the North Atlantic States. However, the growth of cities with a consequent increasing demand for dairy products, soon made dairying more profitable. As wool could be more cheaply grown on the free western grazing lands, sheep in the East have been steadily displaced by dairy cows. The increasing cost of producing western wool now makes it seem advisable to increase the number of eastern flocks. While there is doubtless an economic place for many more farm flocks, efforts at stimulating the industry have not been wholly successful. In fact, during the last decade there was a 15 per cent decline in the North Atlantic States. The hesitation on the part of eastern farmers to keep more sheep is pri-
marily due to a lack of knowledge as to their care, to losses from disease, and especially the fear of trouble from dogs.

In the bean-growing and fruit districts of western New York, sheep, although occupying a secondary place, are an important farm enterprise. They utilize the pastures and the unsalable rough feeds, particularly bean straw, fully as well as dairy cattle, and require much less attention during the summer months when all of the farmer's time is needed in caring for crops.

A number of men in this section and in Ohio specialize in producing winter or "hot-house" lambs. These lambs are born in the late fall or early winter and are marketed from Christmas to Easter time, usually bringing fancy prices. Such lambs are expensive to produce, as much grain and special care are needed, while consider-

![Sheep on a Corn-Belt Farm](image)

**Fig. 18.—Small flocks can be used to clean up weeds, fence corners, and waste places. Such flocks do not require constant care during the crop-growing season; consequently, they can usually be run very cheaply. However, they can not be neglected.**

able difficulty is experienced often in getting the ewes to breed at the proper season. Moreover, the demand is quite limited, being largely confined to the first-class hotel and dining-car trade, so that the business can easily be overdone. During the past six or eight years this business has been on the wane, as production costs have been prohibitive.

*North Central States.*—In the rougher sections of the Corn Belt, where much of the land is pasture, flocks of 50 sheep or more are common, and are usually associated with herds of breeding beef cattle. This is especially true in the more broken regions of northern Missouri and southeastern Iowa. There are also numerous flocks in parts of northeastern Indiana and southern Michigan. While there are many fine-wool sheep, as in southwestern Iowa, the mutton breeds, especially the Shropshires, generally prevail.

In preference to keeping permanent flocks a considerable number of Corn-Belt farmers have followed the practice of purchasing each
fall a bunch of western range ewes that have been discarded because of age. Such ewes will do well for a year or two longer on farms where the feed is more succulent and more easily obtained. These ewes are generally bred to mutton rams. After the lambs have been shipped the ewes are generally fattened and sold.

Although Ohio is still one of the leading wool-producing States, its sheep have declined steadily in numbers since 1883. The decline has been about 30 per cent during the last decade. This is due partly to the low value of wool prior to 1917 and the steady substitution of dairy cows. In southeastern Ohio, the “panhandle” of West Virginia, and the adjacent counties of southwestern Pennsylvania, there is a large area of hilly country where only about one-fourth of the land is cultivated. In this section (known as the Ohio fine-wool region) sheep, mostly Delaines, are kept extensively, along with beef cows. In this region there has been a tendency to displace sheep with cattle, but it has not generally been successful, as cattle do not graze the steep, hilly pastures to the best advantage.

There has been a tendency also to substitute mutton and crossbred animals for the fine-wool sheep. However, they are not so well adapted to the conditions. Furthermore, this region produces an excellent quality of fine wool that commands the highest market price. While the flocks have generally decreased in size, the Delaines still persist. The former practice of keeping wethers, however, has largely been discontinued. The present practice is to fatten the wether lambs during the winter and sell them in the spring, although some are held until after the second fleece has been shorn. The ewe lambs are mostly retained or sold for breeding purposes.

South Atlantic and South Central States.—Sheep have never been important in the South Atlantic and South Central States, except in parts of the Virginias, Kentucky, and Tennessee and in the southwestern prairie country where range methods prevail. In the four States just mentioned there are districts where the production of early lambs has reached a high stage of development. In the western part of Virginia, the adjacent part of West Virginia, and to some extent in North Carolina, there are numerous mountain valleys where the limestone and certain other soils produce rich bluegrass pasturage and where most of the land is kept in sod (fig. 19). These pastures are primarily utilized for fattening cattle. On nearly all of these farms sheep are run as a secondary enterprise for the production of lambs, which are marketed in June and July. The ewes are run on the rough hillsides during the summer and fall months, being brought down to the bluegrass pastures for the winter, where they are kept until after the lambs are sold. While they get most of their winter subsistence from the bluegrass pastures, they are sometimes fed a little hay and grain and in some instances grazed on grain pastures.

Much the same method is used in the bluegrass district of Kentucky, except that there are no mountain pastures. In central Tennessee the ewes get most of their winter grazing from wheat fields. They are taken from these areas in April in time for the wheat to mature and produce a good crop of grain.

In these regions approximately half the producers sell all the lambs and maintain the breeding flocks by purchasing mature ewes. These purchased ewes are obtained from the neighboring mountain
districts, from the Piney-Woods region of the South, and from the western ranges, and are bred to rams of the mutton breeds. Because of the succulent nature of the pasture grasses which insures an abundance of milk, the lambs, which are born from January 15 to April 15, make a rapid growth and are ready for the May, June, and July markets. As there is a relatively small supply at this time, they usually command a good price.

In the Appalachian Mountains outside the limestone areas there are many small flocks, which seldom exceed 50 head. The sheep, which are of a nondescript type, are allowed to run wild most of the year, although they are usually given the run of the farm during the winter months, occasionally receiving a little additional feed. Because of depredations and hardships, flock increase is not very great and the owners depend mostly on the wool. While the receipts from the sale of wool are low; nevertheless they are of considerable

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**Fig. 19.**—The production of lambs for the early markets is highly specialized. In the valleys of California, where there is excellent winter grazing, the production of lambs for the April and May market is rapidly developing. In the Pacific Northwest many lambs are produced for the June and July market. In the blue-grass districts of Kentucky, Tennessee, and the Virginias early lamb production is also an important industry. In Michigan, Indiana, and Ohio lambs are usually fattened in barns. In the Central West lambs are fattened in cornfields. Farther west, where open winters prevail, lambs are fattened in yards. In the upper Ohio Valley, where the country is much broken, Delaine sheep are kept for the production of wool. The practice of allowing sheep to run wild in the Piney Woods section of the South is declining. The keeping of sheep in wolf-proof fenced pastures is rapidly growing in Texas.

importance to owners who have a very limited income. The number of these mountain sheep is declining.

In the Cotton Belt less than 3 per cent of the farmers have sheep and the farm flocks are generally small. Most of the improved acreage is devoted to the production of tilled crops, principally cotton and corn, with some small grain and hay. The few pastures that exist are hardly sufficient for the necessary work stock.

In the Piney-Woods region, which borders the Cotton Belt on the east and south, there are large areas of undeveloped land that are utilized as open range (fig. 19). Although the grass is somewhat sparse and of inferior quality, this land carries considerable stock. In this region sheep, cattle, and hogs, which are mostly in the hands
of large land owners, are allowed to run wild throughout the entire year. Each spring the sheep are rounded up, shorn, branded, and the ram lambs castrated. They are of a nondescript type which shear an average of about 3 pounds of coarse wool. As there is a heavy loss from internal parasites, predatory animals, and insufficient feed during the winter, the death rate in the past has been nearly as large as the birth rate. At present there is a tendency to give them a little more care and to improve their quality. There are some sales of ewes to the early lamb districts but most of the income is from wool, which, although low in value, costs but little to produce.

*Western Farm Flocks.*—In recent years numerous flocks of from 25 to 50 head and more have been springing up on the irrigated farms of the West. In the small, irrigated valleys which lie in the center of extensive range areas, farming is generally based on the production of winter feed for range stock. On the larger irrigation projects, such as the Yakima Valley, Washington, and projects along the Snake River in Idaho, where a great surplus of feed can be produced, it is necessary to grow other crops, such as fruits and sugar beets. In order that such farms may be kept at their highest efficiency it is generally necessary to keep some farm livestock to help utilize unsalable products and to furnish manure with which to maintain soil fertility. The sale of dairy products is somewhat limited and beef cattle do not fit in well on such small farms. It has, therefore, been found that sheep, which can be used to excellent advantage in keeping the ditch banks free from weeds and to graze waste corners, have an important place, especially as they require but little labor during the busy season. For this reason it is probable that their numbers will rapidly increase in the near future. In the northwestern irrigated valleys, where they occur most frequently on farms of 80 or more acres, the mutton types, especially Hampshires, prevail. Many of the flocks are purebred, the best males being sold to range operators. Most of the lambs, however, are sold as early spring lambs. In the Willamette Valley, long-wooled sheep prevail. These sheep are especially well adapted to the mild but humid climate and are very useful in keeping the pastures, many of which are cut-over lands, free from shrubby growth.

**Range Sheep.**

The western practice of running sheep in large bands was developed as a means of utilizing the vast areas of free grazing lands in the Plains and Mountain States. Bands of from 2,000 to 5,000 head were common, each band being under the care of a herder who remained with them constantly to guard against wild animals, to prevent loss through straying, and to direct their grazing. There was also a camp tender for every one to three bands who brought in supplies and moved camp. In the larger companies there were foremen who had general supervision over every 5 to 10 bands and who hunted for the good grazing areas. In a small outfit the owner frequently served as camp tender or foreman.

The sheep were primarily kept for their wool and were run on the open range throughout the entire year. They frequently traveled long distances, there being record of bands that were driven from the Pacific coast to Missouri River points, taking a couple of years en
route. The business was wholly nomadic, there being no investment in land or buildings. The only investment was for a camp outfit, costing from $200 to $400, and for the sheep, which were worth about $2 a head. Practically the only expense was for labor, which at that time was comparatively inexpensive, and for necessary camp supplies. The operating expenses were, therefore, very low, it being stated that some flocks were run as cheaply as 50 to 75 cents per head per year.

With the gradual taking up of the best grazing lands for farming purposes, the livestock were steadily pushed back to the rougher and more arid areas where competition for range became very severe. The cattlemen, especially the large companies, were the first to feel this competition and many were forced to discontinue. This was partly because the cattle, not being herded, could not easily be shifted from congested and overgrazed areas, and also because sheep, which graze more closely, could get feed where cattle could not. Later, as large areas of range were patented and consolidated into numerous holdings, cattle, which can be handled in small numbers, in turn began crowding out the sheep, as under range conditions sheep can be economically run only in comparatively large numbers. This is especially true of the Great Plains region, where small herds of cattle kept in connection with dry farming have rapidly displaced sheep. In Montana and Wyoming, which were the last to feel this movement, there was a decline in number of sheep of 59 per cent and 62 per cent respectively during the period 1909-1919. This decline was partly due to the dry season of 1919 and the financial difficulties following, but more largely to the rapid homesteading of land under the law granting 640-acre homesteads.
In order to remain in business most of the range operators have been compelled to purchase or lease sufficient land to control their range. In some instances this has meant the acquiring of a sufficient number of small holdings to control the watering places. In other cases it has meant the purchasing or leasing of the greater part of the range. In many instances it has been necessary to develop more watering places, build warehouses for the storage of feed, and in other ways develop these holdings. It is now necessary to own improved ranch property before one can obtain permission to use the national forests. This investment in land and improvements has greatly increased the necessary capitalization. In some localities this capitalization is as high as $14 per sheep. At present an investment of not less than $13,500 is usually needed in order to engage in the range sheep business. This would be apportioned somewhat as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 to 1,000 breeding ewes at $8 to $10 each (one band)</td>
<td>$6,400</td>
<td>$10,000</td>
</tr>
<tr>
<td>20 to 25 rams</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>Camp outfit</td>
<td>600</td>
<td>1,000</td>
</tr>
<tr>
<td>Home ranch to serve as operating base</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Cash with which to meet current expenses</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Total</td>
<td>13,600</td>
<td>18,000</td>
</tr>
</tbody>
</table>

While there are numerous bands with a much lower investment, these are generally operated by persons of foreign birth or descent who are willing to live very cheaply, and who usually act as herders or camp tenders. In order that a man may make a managerial wage he should have at least two bands.

This constant crowding has necessitated the retirement of many range operators and a considerable curtailment of most of the range flocks, until at the present time (1923) there are only about 21,000,000 sheep in the 11 far Western States. The sheep, with the exception of those on southern ranges, have been forced, in large measure, into those regions that include desert lands, which can be used only in win-
ter when snow and water are available, and also afford summer grazing in the mountains. The greater part of the summer grazing areas are now included in the national forests, where grazing is regulated by the United States Department of Agriculture.

Operating expenses have also greatly increased. The crowded conditions make it necessary, except on the southern ranges, to provide considerable winter feed, the amount varying with the locality and with the season. The labor costs per sheep are also much greater. This is partly because it has become necessary to reduce greatly the size of the bands, which now vary from as low as 600 head up to 2,000 head, seldom exceeding 2,500. It is also necessary to use more men, as most operators now have a camp tender with each band, who spends most of his time in helping to herd. There has also been a considerable increase in the wages paid.

These increased operating expenses have made the production of wool alone generally unprofitable. Fortunately, the increasing demand for mutton, especially lamb, has made it possible for the range operators to change from a strictly wool-producing basis to that of producing both wool and lamb. At the outbreak of the World War the majority of range operators were giving more attention to the production of lambs than of wool. The first step in meeting the higher operating expenses was the elimination of the numerous bands of wethers, which were kept primarily for their wool. The development of a type of ewe that would produce a good market lamb and a readily salable grade of wool, and at the same time maintain the herding instinct of the Merinos, was accomplished by breeding Ram-
bouillet ewes to coarse-wool rams. In many cases this crossing with coarse-wool animals was carried to such a point that at the outbreak of the war many of the ewes were losing their herding instincts and had very inferior fleeces. With the high prices for wool that prevailed from 1914 to 1920, there has been a tendency to breed back to the fine-wool type. As it is difficult to keep the desirable characteristics of the first cross, various efforts have been made to secure a fixed type of crossbred sheep.

In order to keep the breeding stock at standard strength it is generally necessary to replace about one-fourth of the flock each year. The early lamb raisers usually make this replacement by direct purchase, but most flockmasters save a sufficient number, about half of the ewe lambs, for this purpose. Under ordinary range conditions crossbred ewes must usually be discarded by their sixth year, while Merinos last from one to two years longer. These discarded ewes usually sell for about half of their original value when entering the band. In spite of the discarding of aged ewes there is a considerable annual loss by death and occasional heavy losses due to droughts or severe winter storms.

The breeding expense, when figured separately, usually runs a little over 50 cents per ewe. This is made up of two items. First, the expense of keeping the rams, which is much heavier than for ewes inasmuch as the rams must be run in small bands of from 350 to 500 head, and must be given more care. The second item is for the purchase of rams, there being about 20 to 25 rams to every 1,000 ewes. The majority of the sheepmen purchase yearlings, as ram lambs are usually not hardy enough. These yearlings cost approximately from $30 to $40 a head, depending on their quality. The approximate period of usefulness of such an animal is about five years, at the end of which time he has practically no sale value. However, as there is about a 20 per cent annual loss, few last so long.

The New Mexico-Arizona Region.—The fewest operating changes have taken place in the southern range States, where, because of the very low rainfall, there has not been much interference from dry farming. In southern New Mexico, where the climatic conditions at breeding and lambing time are frequently unfavorable, the lamb crop averages approximately 60 per cent. For this reason fine-wool sheep predominate. In order to operate successfully in this region it is usually necessary to control land on which water can be developed.

In northern New Mexico and southern Colorado many of the sheep are owned by persons of Mexican descent, some of whom operate on a very small scale. The flocks, which are mostly Merinos, usually range from 500 to 1,000 head. Although the feed is somewhat sparse, the climatic conditions are more favorable for the production of lambs. The majority of these lambs are shipped to the eastern Colorado and Corn-Belt feed yards. The sheep are kept on the open range throughout the year and travel comparatively short distances to and from the summer and winter ranges.

The Arizona sheep are run mostly on the high plateau area in the northern half of the State during the summer season. About 70 per cent of them are within the national forests, the rest running on patented (mostly railroad) lands and Indian reservations. As water
is scarce, it is necessary to build large storage reservoirs costing from $1,000 to $15,000 each, where the run-off from the occasional rains can be stored. During the winter season most of the sheep are grazed in adjacent valleys and protected areas, while about one-third are driven or shipped to the foothills and desert areas in the southwestern and western parts of the State. In years when there are favorable rains, the sheep get about six weeks of excellent grazing on the deserts. If the rains fail, much trouble is experienced in getting sufficient feed and water for the flocks.

As most of the feed throughout Arizona is too sparse to make it possible to produce fat lambs, and as much of the range is so brushy that the sheep must be closely herded, the Rambouillet predominates. The operators who depend on using the deserts for a part of their winter grazing generally aim to have the lambs born in February, so as to be ready to rush onto these areas as soon as the rains come. Some of them breed their ewes to Hampshire rams, shipping all of these lambs to the early market. In the northern districts the lambing season usually comes in May and the lambs are sold in the late fall most of them as feeders. In years when prices are unsatisfactory, or when the lambs make a poor growth, they are sometimes held another year.

All of this southern range is subject to occasional droughts, some of which are of long duration. At such times it is necessary to buy large quantities of feed in order to carry the sheep through, and to ship large numbers of them out of the country. In spite of these efforts there are sometimes heavy losses through starvation.

Central Range Region.—In most of Wyoming, Utah, Nevada, and in parts of northwestern Colorado and southern Idaho and Oregon sheep are run in the mountains to a considerable extent, generally within the national forests, from about the middle of June to the middle of October. They are then grazed toward the winter ranges, usually remaining in the foothills until about December 1. As soon as there is sufficient water and snow available, they are driven on to the desert areas where they remain as long as the water lasts. Whenever possible, the operators generally provide sufficient feed to carry the sheep through periods of stormy weather. Those grazed near irrigated districts are frequently fed considerable hay. In April they begin moving toward the summer ranges, from 50 to 150 miles away. The lambing season usually comes in April and May and shearing in late May and June while the sheep are on the intermediate range.

As on the southern ranges lambing is usually conducted on the open range, efforts being made to select camps that are reasonably protected from storms and where there is plenty of feed and water. In some instances tent shelter is provided. The lambs are usually weaned about the time the sheep leave the national forests. The lambs not retained for breeding purposes are then shipped, most of them going to the primary markets. As the feed is more luxuriant than farther south, many of the lambs are fat enough to go direct to the slaughterers. A very large proportion, however, are finished in feed yards.

California Region.—In California the methods of handling sheep are quite diverse. In the northern half of the State the same general methods that prevail in the central range district are found. The
The Sheep Industry.

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majority of sheep are run on the national forests or privately owned or leased land during the summer. The rest of the year they are largely kept on privately owned range, in stubble fields, or wherever suitable grazing can be found.

In the southern part of the State the sheep are handled in much the same manner as in Arizona. During the summer months all that can be accommodated are grazed on the national forests. The rest are run wherever suitable range can be found. In the winter and early spring they are run on the desert areas, if there is sufficient rainfall for the feed to grow. They are also grazed in stubble fields, in vineyards, or wherever forage can be found.

Formerly a large percentage of the lambs were born in the spring and marketed in the fall, but in recent years the practice of lambing in midwinter has grown rapidly. The production of these winter lambs started about 15 years ago in the Imperial Valley of California and in the Salt River Valley of Arizona. Farmers in these valleys would purchase aged range ewes, breed them to mutton rams, and graze them on alfalfa pastures. The lambs which were born in December were ready for the April and May markets. Since the World War many of the alfalfa pastures have been plowed up for the production of cotton. However, the demand for such lambs has been so keen that many sheep growers in the San Joaquin and Sacramento Valleys have begun producing winter lambs. The lambs are marketed during April and May, the majority of them being shipped between April 15 and May 15. It is estimated that in 1923 approximately 300,000 lambs were marketed during this period. Most of them were shipped to Chicago and Kansas City, although the coast cities consumed a considerable number. The California lambing season now extends from November and December in the Imperial Valley into May in the northern counties of the State.

Northern Range Region.—The greatest changes in management have taken place in the northern range States. The majority of the sheep now remaining in Montana and northeastern Wyoming graze during the summer on the national forests and are run on privately
owned land or on Indian reservations during the remainder of the year. In many cases it is necessary to feed them for a period of from three to five months.

A few of the sheep in Washington and northeastern Oregon are able to get some winter grazing from the semidesert areas. However, the greater number are grazed on privately owned land (much of which is in the wheat-growing sections), that is too rough for cultivation, except for a period of three or four months in summer when they are in the mountains. Most of the sheep in central Washington are fed alfalfa hay for a period of from three to five months in winter. In order to meet the consequent high operating costs, many of the sheepmen have turned their attention in recent years to the production of early spring lambs.

This spring-lamb industry has reached its highest development in Idaho, where the sheepmen have succeeded in developing a type of lamb that seems well adapted to market requirements. Very nearly half of the Idaho sheep raisers are now engaged in early lamb production. The irrigated valleys produce large quantities of alfalfa hay for which a market must be found. As there is not sufficient desert land, except in the southern part of the State, on which to winter their sheep, and as the spring and fall range is also limited, the Idaho flockmasters have come more and more to depend on winter feeding.

The ewes, which are a cross between the long-wool breeds and the Rambouillet, are brought onto the irrigated farms in the late fall and fed alfalfa for a period of three to five months during the winter. A large percentage of them are bred to Hampshire rams sufficiently early to lamb in February, the lambing operations being conducted in specially constructed sheds (fig. 25). The lambing equipment on
the better organized farms usually represents an investment of about $1.50 per ewe. The raisers of early lambs in Washington and Oregon, having a more broken range, are compelled to use Ramboillet ewes, which are generally bred to Hampshire rams.

Not only does this Washington-Oregon-Idaho early lamb district produce a high-quality lamb, but, because of the better care which the ewes receive, a much larger lamb crop is generally obtained than under ordinary methods of range management. This lamb crop frequently exceeds 85 per cent and many flockmasters report occasional crops slightly in excess of 100 per cent. The lambs are generally shipped in June, July, and August, at which time they command top prices. As most of the flocks, because of the lack of sufficient fall range, must be reduced to a minimum as soon as they come out of the forests, and as the ewe lambs, because of their mixed breeding, would not be suitable for range purposes, the entire crop is sold. The breeding flocks are largely maintained by purchasing ewes from districts which have difficulty in producing fat lambs.

Southwestern Texas.—Texas leads the States in the total number of sheep. There is no public domain since Texas, when it entered the Union, retained title to all public lands, and practically all the grazing lands have been sold to livestock producers. Many of the ranchers have put up wolf-proof fences, constructed concrete water tanks, and made other improvements. A large part of the sheep industry is, therefore, conducted in a manner somewhat intermediate between the western range and the eastern farm systems.

The principal sheep-raising area is the Edwards Plateau, adjacent districts, and westward. Cattle and goats are frequently grazed

![LAMBING SHED AND CORRALS, UNITED STATES SHEEP EXPERIMENT STATION, DUBOIS, IDAHO.](image-url)
on the same land with the sheep. In the northern part of the area cattle predominate and only enough sheep are kept to graze the weeds and other feed that cattle will not touch. As the sheep do not displace any cattle, and, in fact, when properly run have a tendency to improve the cattle range, their inclusion increases the gross carrying capacity of these pastures. To the south, as the grass is replaced by shrubs, sheep become more numerous and only enough cattle are run to utilize the grasses that the sheep do not care for. On the more brushy ranges goats in turn predominate, while sheep are a secondary enterprise, there being only a few cattle.

The majority of the sheep in this district are in small units averaging from 600 to 1,000 head. Many of them are herded in much the same manner as in New Mexico. However, in recent years, the practice of turning the sheep loose in pastures which have been fenced against predatory animals has been rapidly increasing. While such fences are very costly ($250 to $300 per mile, pre-war prices), it has been found that a pasture will carry nearly double the number of sheep when they are allowed to run loose than when they are herded, as there is much less destruction of feed through trampling. It has also been found that one man can handle nearly twice as many sheep. Furthermore, large lamb crops and better lambs are generally obtained than where the sheep are herded.

Sheep ranching in this district is on a wool-growing basis, as difficulty is experienced in getting good lamb crops. The lambs are generally born in April and May. Most of them are retained, the ewes for breeding purposes and the wethers until one or more crops of wool have been obtained. In favorable seasons the wethers are generally fattened on winter pasture before selling. Partly because of the brushy character of the range and partly because of the comparatively warm winters, about one-third of the sheep are sheared twice annually, in April and in September or October. They shear an average of about 8 pounds per head per year.

Fattening Sheep for Market.

Fattening sheep for market is extensively followed in several sections of the Corn Belt and adjacent areas, and in many irrigated districts. There are three general systems of finishing: (1) Fattening in cornfields in the Corn-Belt States; (2) open-yard feeding west of the Missouri River; (3) fattening in barns in the East Central States.

Fattening in Cornfields.—The practice of fattening lambs by turning them into the cornfields and allowing them to harvest the crop is followed in districts throughout the entire Corn Belt. It is, however, most common in Iowa and northeastern Nebraska, where it is the prevailing type of sheep finishing. Most of the lambs are purchased at the central markets, Omaha and Chicago principally, in September and October, although some are taken in August. The lambs are usually given the run of the pastures and hay fields and allowed to clean up weeds and waste corners for a period of a week or two. They are then turned into the cornfields in which rape has usually been planted, and are allowed to harvest the crop (fig. 26). Most of them are sold in the latter part of November and in December. The lambs that are not fat enough are held over and fed ear corn on pasture or in dry lots and shipped in January. This practice
has the advantage of requiring but little labor and practically no equipment. The death rate is usually greater than in open yard or barn feeding.

Open Yard Feeding.—The practice of feeding in open yards prevails west of the Missouri River where there is comparatively little stormy weather during the early part of the winter. The most extensive feeding district is in Weld and Larimer counties and vicinity, in northeastern Colorado, where from 500,000 to 1,000,000 head are fed annually. Other extensive feeding districts are the Arkansas Valley in southeastern Colorado, the Scotts Bluff district in western Nebraska, and along the Platte River in Buffalo, Hall, and Merrick counties, in Nebraska. There are other small areas in Nebraska and Kansas, and also in the irrigated valleys of the far West (fig. 27).

The fattening of lambs occupies an important place in the beet-growing districts as it helps to provide a market for the large quantities of alfalfa which must be grown in the rotation system and also for the utilization of the beet tops. The manure is highly prized in helping to maintain sugar-beet yields. As corn is grown only to limited extent in these districts it is shipped in from Nebraska and Kansas. Barley, oats, and even wheat are fed also in the early stages of the fattening process. In Nebraska the lambs not only help to provide a market for alfalfa, but also help in utilizing some of the surplus corn.

A large percentage of the lambs are fed in bunches that vary from 250 to 5,000 head. There are, of course, men who operate on much more extensive scale. These are usually large landholders who distribute their sheep about on different farms, seldom having over 5,000 to 10,000 sheep in a single yard. Most of the lambs are put in the yards in October and November. The northern range lambs usually
weigh about 60 pounds and the southern lambs from 50 to 55 pounds when delivered. They are fed for a period of four to five months, during which time they make a gain of from 25 to 30 pounds. It is generally figured that during the feeding process a lamb will consume about 250 pounds of hay and 150 pounds of corn or its equivalent. As the lambs do not finish evenly, it is a practice, especially in the larger yards, to sort out the fat lambs from time to time so that they are generally marketed in several shipments. These shipments usually begin in February, the bulk of the lambs going in March and April and sometimes there are shipments in May. Some of the operators also handle a limited number of aged ewes and wethers.

Feeding in barns.—In the East Central States, where there is much stormy weather in the late fall and winter months, lamb feeding is usually carried on in barns. While barn feeding is practiced in parts of Illinois, it is most extensively followed in northeastern Indiana and southern Michigan, in parts of Ohio, and, to a limited extent, in western New York. Although charges for labor and equipment are much higher than where the lambs are fattening in cornfields or in open yards, barn feeding furnishes gainful occupation for the farmer during the winter months when ordinarily there is not much farm work. There is also much less risk as the sheep are given more attention. The majority of these farmers handle only 150 to 300 head, and plan to get lambs that will finish evenly. The majority of lambs are purchased at Chicago. They are fed from four to five months and then shipped to Buffalo, Pittsburgh, or other eastern markets. As the cost of grain is higher than farther west, these eastern farmers find it difficult to compete with the Corn Belt and Colorado feeders. They feel, however, that they can afford to feed on a very close margin for the sake of the manure, which is much needed in maintaining soil fertility.
The annual losses among sheep are from various causes (fig. 28). In the farming States most of the losses are from parasitic diseases, although there are some losses from lack of care and shelter. Dogs also inflict much damage. In the Piney-Woods region of the South there are considerable losses from predatory animals and from lack of feed in winter. In the range States the annual losses are principally due to straying from the band, poisonous plants, predatory animals, and parasites. Such losses vary from year to year and according to the character of the range. They average from 7 to 8 per cent on the northern ranges and a little higher on the southern. In addition there are also periodic losses, due to drought or unusually severe winters. In the early days loss from sudden, severe storms was of frequent occurrence and sometimes very devastating. In recent years it has been possible to avoid much of this loss by providing winter feed and by more careful methods. Even with the best of care such losses can never be wholly eliminated. The losses due to straying depend largely on the herder and on the character of the country. These losses are unavoidable in a rough country, and are frequently large when inexperienced or careless herders are employed. On the other hand, they are generally small when the sheep are in the hands of careful herders and in an open country.

Poisonous Plants.

There are a great many plants that cause sickness and death among sheep. These occur in all parts of the United States. Because of the greater number of sheep and because of the method of handling them on the range, the losses of economic importance are largely confined to the western range country. Sheep, like other animals, if left to themselves or if grazed in loose formation, seldom eat enough

![Fig. 28.-On the western range predatory animals, poisonous plants, and exposure on hazardous grazing grounds cause considerable loss. In the farming States internal parasites constitute an important cause of loss, particularly among lambs. Lamb losses are generally larger than those for mature sheep, especially in the humid regions. Much of this loss occurs at lambing time during cold rainy weather.](image)
of any poisonous plant to suffer from its effects; but, under the system of close herding that prevails in many regions, where they eat practically all the vegetation as they move along, they are much more liable to poisoning and sometimes heavy losses occur. Many sheep are lost on driveways. The first bands passing over a drive-way usually consume all the good forage. Succeeding bands, especially if they are hungry, will take such poisonous plants as may be there. Sheep having passed over trails where there is little forage and emerging on patches of poisonous plants frequently gorge themselves on these plants with fatal results.

There are three groups of plants on the western ranges which are especially destructive to sheep. Of these the locoes, of which the white loco is especially poisonous to sheep, were formerly the most harmful. These are found in the Great Plains area extending from Canada into Mexico. In the southern range area they also extend westward into California and north into Utah. With the homestead settlement of the plains country the sheep have been driven out of much of the region where these plants grow.

Second in importance, and in late years perhaps first, are the species of death camas. These are found in the higher parts of the Great Plains area and west to the Pacific. Some of them grow in damp meadows, others on rather dry hillsides. These plants cause most of the losses from poisoning that occur in the spring and early summer. The lupines, of which there are many kinds, doubtless rank third. These are even more widely distributed than the death camas. They are not all equally poisonous, but it is not known which are harmless. Lupine leaves rarely, if ever, injure sheep, but heavy losses have been produced by eating the pods and seeds. The losses occur in the summer and fall months.

There are other groups of poisonous plants which are common to the East and West. Among these are the laurels, of which there are several kinds, which cause a considerable loss among sheep grazing in the eastern United States. Some western laurels are especially destructive to sheep. The leaves of wild cherries also take a considerable toll, especially among sheep that are driven over a trail where very little other feed is obtainable. Although the aggregate losses from wild cherries are not great, in some places they may be very heavy.

The milkweeds, the rayless goldenrod of New Mexico and Texas, the Colorado rubber plant of Colorado and New Mexico, and the coffee bean of Texas, are some of the other plants which also cause losses. The western sneezeweed is a serious menace in Utah and portions of the Southwest.¹

There is no way of determining the magnitude of the losses among sheep from poisonous plants, as such losses are seldom reported. There are numerous records of individual herds where the losses have been 50 per cent or greater. It has been stated that the losses in Colorado amount to $1,000,000 annually. At the present time there is no practicable method of eradicating most of these plants. However, a careful and experienced herder, who is familiar with the plants and the places where they occur, can do much to prevent such losses.

¹The distribution of some of the poisonous plants of the West is shown in Figures 75 and 76 of the article “Our Forage Resources,” page 401.
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Predatory Animals.

The western livestock owners suffer heavy losses from depredations of predatory animals, these losses being formerly estimated to amount to from $20,000,000 to $30,000,000 annually. Wolves, coyotes, and bobcats are the greatest offenders, and in many localities inflict such heavy and continuous losses as to make sheep raising an unprofitable enterprise (fig. 29). In the earlier days the individual stockman endeavored to combat these predatory animals on his own range by employing hunters to shoot, trap, and poison them. The payment of bounties for animals taken was also resorted to. These individual efforts were not satisfactory and demonstrated the necessity for organized effort in order to secure adequate results. The coordination of the efforts of all those directly interested in the problem was then undertaken. As the Department of Agriculture had charge of the control and eradication of predatory animals in the national forests and on the public domain, and as it had already developed methods of eradication which had proved eminently successful, the work is now largely conducted under its general supervision.

At present the department is cooperating with many States, county officials, and livestock associations in well-organized campaigns for the destruction of these pests. Congress has appropriated $274,000 for fighting these animals during the fiscal year 1924, while 13 States, mostly western, have appropriated $285,000 for cooperation during this period. Additional funds have also been provided by stockmen's associations. A well-organized force of hunters, who are supervised by capable and experienced men, and who have been thoroughly trained in the most up-to-date and efficient methods of trapping, poisoning, and den hunting, are employed. Substantial headway has already been made and stockmen report greatly improved conditions, with losses entirely eliminated in some instances and markedly reduced in others. Approximately 500,000 predatory animals have been destroyed since 1915.
In the greater part of the farming region losses from wild animals are comparatively small. Throughout all of this region, however, farmers suffer severe losses from predatory dogs. While dogs do considerable damage to all classes of livestock, their depredations on sheep are especially severe. No accurate figures are available as to the damage caused by them. However, as a result of an investigation conducted in 1913 it was estimated that a total of 108,000 sheep which had been killed by dogs the previous year were paid for out of State and county funds. This figure does not take into consideration the damage to the rest of the flock which, from a monetary standpoint, is usually much greater than the actual killings. Sheep which have been frightened seldom do well, and if this occurs in the late fall there is usually a heavy loss of lambs the following year as well as a much reduced wool clip. The fear of damage from dogs keeps many men out of the business who otherwise would be glad to engage in it. Most of the States now have laws for the control of dogs. In a number of States the county pays for the animals actually killed, while in others the owner of the dog is held liable for all damage done by it. Nearly all States make it illegal to keep a sheep-killing dog, while a few States have laws making it a misdemeanor to allow dogs to run at large. Some States, notably Michigan, have laws that are proving to be a real protection to sheep.

Parasitic Diseases.

Sheep probably suffer more from animal parasites than do any other kind of livestock, although ordinarily they are but little subject to diseases caused by bacteria and viruses. Most of these losses occur among lambs, as these young animals are usually more heavily parasitized and appear to be more seriously injured by a given infestation than are the older animals. Parasites of sheep are of two general types, external and internal.

External parasites.—The external parasites are those which live on the skin or in the skin or hair follicles, such as lice, ticks, and scab mites, or which attack the exterior of the animal from time to time, such as blood-sucking flies. The most important of these external parasites are the scab mites and sheep ticks.

Scabies is one of the oldest known, most contagious, and most injurious diseases affecting sheep (fig. 30). Its history dates back to the earliest age of civilization. It is easily transmitted from one sheep to another and spreads very rapidly after being introduced into the flock. When allowed to spread, sheep scab causes financial loss to the industry, (1) by a decrease in the quantity of wool produced, (2) by the unthrifty condition of the animals, and (3) by the death of large numbers of infested sheep. It was formerly the greatest drawback to the sheep industry of the United States. The migratory character of the western sheep business was very favorable to the spread of this parasite. The sheep were frequently exposed to the disease by infected ranges and trails, by "picked-up strays" from other infested flocks, and in many other ways.

Although scab is highly contagious, insidious in its nature, and severe in its effects, it yields rapidly to proper treatment and is easily cured. It is, therefore, highly desirable to eradicate the disease so far as possible. For this reason the Department of Agriculture has extended aid to the industry by controlling the inter-
state movement of sheep to prevent the carrying of infection from one State to another. Cooperative work has also been carried on with the livestock authorities of the various States concerned, with the intention of completely eradicating the disease. This work has been in progress for 17 years. During this time the disease has been very greatly reduced over most of the previously infected area. However, taking the country as a whole, considerable expense is involved in keeping it under control.

The sheep tick, which is really a wingless parasitic fly, is widely distributed in many of the sheep-growing countries of the world. In this country it is found in practically every State. It is most prevalent, however, on the western ranges where sheep are herded in large flocks, the northern two-thirds of the range country being the most heavily infested. The previous custom, in a majority of the principal sheep-growing States, of dipping the flocks regularly for scab evidently served at the same time to control the tick. With the eradication of scab in many States, dipping, especially in the Northwest has been discontinued to a great extent. Subsequently, the ticks have spread rapidly and become so prevalent that compulsory dipping again has become necessary in order to eradicate them. In the Southwestern States, where sheep owners still continue to dip their flocks more or less regularly, ticks are not so plentiful. Many of the farm flocks also harbor these parasites.

Other external parasites which cause considerable losses are the screw worm and the various wool maggots. These are especially bad in the warm, humid climate of the South. To avoid serious losses, shearing cuts and other wounds must be properly protected from them. These maggots are also likely to infest sheep suffering from diarrhea.

**Internal parasites.**—Internal parasites live in the tissues, cavities, and tubes of the host animal. In the case of the sheep these parasites
include roundworms, lungworms, flukes, tapeworms, the maggot known as grub in the head, and some microscopic forms.

Of the various roundworms, the stomach worm is probably the most common and important. This parasite, which is found in the fourth stomach, occurs over almost the entire world where there are sheep, goats, cattle, or other suitable host animals. In the United States it is most plentiful in the South, where it is favored by abundant warmth and moisture. It is also a serious pest in the Northeastern and Middle Western States and in low, wet areas throughout the entire country. It is present in smaller numbers and does less damage in the high, dry, and cool areas of the Rocky Mountain region.

It is impossible to estimate with accuracy the losses caused by the stomach worm. However, it is probable that this parasite causes more loss to the sheep industry than any other disease, and that the total loss from it is very large. The stomach worm is probably one of the leading factors in preventing the expansion of the sheep industry in the South; and, together with dogs, it has undoubtedly been responsible for much of the decline of the sheep industry in the Northeastern and Central States. Losses from this cause are greatest among lambs, especially after they are weaned from their mothers and turned on infested pastures. Not only is there a considerable loss by death, but because of this worm infestation a large percentage of the farm lambs have to be marketed in an unthrifty condition. Such lambs always bring a low price in the markets.

The sheep become infected while grazing on pasture. The eggs of this parasite pass out of the body of the sheep in the droppings and are scattered broadcast over the pasture. The young worms which hatch from the eggs feed upon the organic matter in manure and grow until they are nearly one-thirtieth of an inch in length. Further development then ceases until the worm is swallowed by a sheep or other ruminant after which the worm again begins to grow and reaches maturity. The chances of the young worms being swallowed are greatly increased by the fact that they crawl up blades of grass whenever sufficient moisture is present and the temperature is favorable. While the infestation can be avoided to a certain extent by a careful rotation of pastures this method is not entirely effective. These worms can be controlled by the administration every three or four weeks of a 1 per cent solution of copper sulphate in suitable doses.2

The liver fluke is common in certain portions of the United States, especially along the South Atlantic and Pacific coasts and the Gulf of Mexico. It was a serious disease of sheep in California as early as 1883. It is especially prevalent in Oregon. As the flukes require snails for their intermediate hosts, prevention is largely a matter of avoiding wet pastures. Not only is there a considerable loss of sheep resulting from this disease, but there is an additional loss sustained by the packing houses from the large number of diseased (fluky) livers that are condemned at the time of slaughter.

Nodular worms live in nodules in the intestines of sheep. Not only do these cause an unhealthy condition in the sheep, and sometimes death, but where these nodules are numerous, they destroy the value of the intestines as sausage casings. Nodular disease at the present

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2 For further information see Farmers' Bulletin No. 1330.
time is so prevalent in this country that it is necessary to import casings at considerable cost from other countries where the parasites producing this condition are less prevalent. Nodular disease is spreading in the United States and unless suitable control measures are found and applied it is only a question of time when the production of casings from sheep intestines will be reduced to a negligible item.

Gid, which is a disease due to a bladderworm or larval tapeworm occurring in the brain or spinal cord, has caused heavy losses in Montana, where it is most prevalent. Grub in the head is due to a maggot in the nostrils and frontal sinuses. The irritation due to this causes the profuse flow of mucus from the nostrils. Keeping the sheep's nose smeared with pine tar or some similar preparation during the fly season is a valuable preventive. Among the numerous other internal parasites are the blood-sucking hookworm, and worms which occur in the lungs of sheep, causing a bronchitis characterized by a husky cough.

Much can be done in the prevention of parasites in sheep by not keeping them too long on the same pasture. Fairly frequent changes of pasture are desirable, not only for the sheep but also for the pasture. Clean barns and yards, clean feed, and a good, safe supply of drinking water are always important. Dogs are responsible for conveying a number of parasites (tapeworm and tongue worm) to sheep, as well as other farm animals. Stray or unrestrained dogs running over the farm are a source of livestock infestation.

Cost of Producing Mutton and Wool.

The most extensive studies on the cost of producing mutton and wool are those made by the Tariff Board (appointed by President Taft) for the year 1910, and by the United States Tariff Commission for the years 1918–1920. These two studies covered the western range industry and included costs on a total of 3,000,000 and 1,419,000 sheep, respectively. The Tariff Board also made a comprehensive study of the cost of producing wool in the farming States, especially in those sections producing fine wool. The figures published are based on the cost of producing a pound of wool, and no segregation of the individual items of expense has been made. The best figures available concerning recent costs of keeping farm flocks are, (1) an investigation by the United States Tariff Commission in 1918 on the cost of keeping Merino sheep on 18 farms in the Ohio fine-wool section, and (2) a 4-year cooperative study conducted by Purdue University and the United States Department of Agriculture on 42 Indiana farm flocks. The Indiana figures are believed to be representative of Corn-Belt conditions.

Cost of Carrying Range Sheep.

The average cost of running a range sheep for a year under pre-war conditions (1910) was $2.11. For the 3-year period, 1918–1920, which was the peak period of high costs, these figures had risen to $8.30. The operating costs in 1923 were less than for the period of
Fig. 31.—Labor constituted approximately one-third of the total cost, varying from 20 per cent in Arizona, where cheap Mexican labor was obtainable, to over 40 per cent in Wyoming, where because of difficulties with new settlers considerable help was necessary. Interest on investment in sheep and land is the next heaviest item of expense, ranging from approximately 10 per cent in States where but little of the range land is owned, to over 30 per cent in Texas, where interest and rental fees constitute nearly half the total cost. In the latter State the sheep are kept on owned or leased land. The feed bill varied from less than 10 per cent in New Mexico and Texas, where the sheep are seldom fed, to over 30 per cent in Idaho, where winter feeding prevails. The heavy decrease in inventory in New Mexico was due to the liquidation following a 3-year drought. In Texas there was an increased inventory, as the sheep men were rapidly expanding their business. (Data from report of the United States Tariff Commission, "The Wool-Growing Industry," Table XXX.)
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greatest inflation, but much higher than in 1910. This is because it is now necessary, owing to the more crowded condition of the range, to run the sheep in smaller bands and to depend more and more on the use of supplemental feeds during the winter, and especially because of the generally much heavier investment in land than in 1910.

A comparison of the various items of expense shows that in both periods labor constituted approximately one-third of the total cost (fig. 31). It was generally the largest item, except in Texas in 1918–1921, where the practice of herding was giving way to that of turning the sheep loose in large wolf-proof fenced pastures. In both periods the item of feed amounted to about one-fifth of the total cost. This item varies greatly with the region. In the southern range States, where sheep are kept on the open range throughout the entire year, the feed costs are generally small, except during periods of drought. In the more northern regions, as in Washington and Idaho, where most of the sheep are fed for a period of four or five months during the winter, feed is the largest item of expense.

Interest on the investment in real estate has in recent years become a heavy expense to most operators. In Texas, where many of the sheep are now run in inclosed pastures the year round, interest constitutes nearly one-third of the total cost.

Cost of Keeping Farm Flocks.

Figures obtained for 1910 by the Tariff Board on 543 farm flocks (109,000 sheep) in the Ohio region showed the average cost per head, when feed is figured at the cost of raising, to be $2.44. Figuring the

TRENDS OF FARM PRICE OF WOOL IN OHIO COMPARED WITH PRICES OF ARTICLES FARMERS BUY AND OF OHIO FARM WAGES, WITHOUT BOARD, 1910–1923.

Fig. 32.—Farm prices of wool in Ohio were lower in the last half of 1913 than at any other like period since these prices have been reported by the Department of Agriculture. In June, 1911, and again in October, 1921, prices were nearly as low. High prices prevailed from 1917 to 1920, and were also relatively favorable to Ohio woolgrowers during 1923. The money price in 1923 averaged more than double the 1913 price. Farm wages without board in Ohio and prices of articles farmers buy (general index numbers) were fairly stable until they began to rise early in 1915 and reached the high point in 1920, since which time they have receded to a position about 50 per cent higher than in 1913. (Prepared by S. W, Mendum.)
feed at its selling price on the farm, the average cost was $3.37 per head.

In 1918 the cost of keeping sheep in the Ohio fine-wool section (a part of the same region), based on data obtained from 18 farms, on 16 of which sheep were the major enterprise, was $7.11. This is approximately double the 1910 costs. As a number of the sheep were wethers, 67 per cent of the receipts was from wool and 33 per cent from lambs.

The average cost of keeping a ewe a year on 42 Indiana farms for the 4-year period, 1918–1921, was approximately the same, amounting to $7.18. An average of 1.06 lambs and a 7½-pound fleece was produced per ewe. Two-thirds of the gross income was from lambs and one-third from wool. The average size of the flock was 40 ewes, 9 ewe lambs and 1 ram. In both instances the charge for dry feed was the greatest item of expense, amounting to nearly 50 per cent, while that for pasture came second, amounting to 30 per cent of the total cost in Indiana and 20 per cent in Ohio.

The Indiana sheep were fed an average of 94 pounds of grain, mostly corn and oats, and 204 pounds of roughage, about half of which was alfalfa and clover hay. They were pastured for about eight months. In addition to the regular pasture, they were given the run of the farm and allowed to clean up the fence rows and fields from which crops had been taken.

Cost of Fattening Lambs for Market.

The data available on the cost of finishing lambs for market are for three systems of feeding, as follows: (1) Open-yard feeding west of the Missouri River; (2) fattening in cornfields in the Corn Belt; and (3) feeding in barns in the eastern part of the Corn Belt and in New York. The figures obtained are mostly for the feeding seasons of 1916–17 and 1917–18, although one study includes an average for the five consecutive feeding years of 1912–1917.

The feeding season of 1916–17 was one of the most profitable ever experienced by sheep feeders, as the lambs were purchased at practically pre-war prices and were fed on a steadily advancing market at a time when nearly all agricultural enterprises were highly profitable. The season of 1917–18 was generally quite the reverse. The majority of the lambs were purchased at a prohibitive price, and many were sold at the end of a three to five months' feeding period for less than their original cost.

From the standpoint of the operator, the initial cost—the cost of the feeder lamb delivered at the feed yard—is the heaviest item of expense (fig. 33). This charge, which varies considerably from year to year and also with the distance from the source of supply, usually constitutes from 55 per cent to 70 per cent of the total cost. For this reason it is very important that much care be used in buying the sheep. A mistake in judgment as to their value, or how they will fatten, may cause the feeder a heavy loss. The next largest item of expense is for feed, which constitutes approximately one-fourth to one-third the total. This cost varies not only according to seasonal prices but also with the locality. Hay is generally very cheap in the western irrigated valleys and rather high in the Eastern States. In the eastern feeding districts grain also is more expensive.
The feed used varied with the locality. On the average, 546 pounds of concentrates and 994 pounds of roughage were used by the open-yard feeders in securing 100 pounds of gain. In fattening sheep in the cornfields, 713 pounds of concentrates and 110 pounds of dry roughage (not including cornstalks) were reported as consumed for each 100 pounds gain by the sheep. The amount of corn was unusually high owing to the fact that most of it was soft, having been damaged by frost. The lambs fattened in barns consumed on the average 572 pounds of concentrates and 608 pounds of roughage per 100-pound gain.

State experiment station literature on lamb feeding often reports lower feed requirements. However, the lambs in these experiments

![DISTRIBUTION OF THE MAJOR COST ITEMS IN FATTENING LAMBS.](image)

usually have been carefully selected for the proper weight and feeder condition to secure rapid and economical gains. Skillful feeding and short feeding periods on which some of the experimental data are based also favor especially economical gains.

In the winter of 1916–17 the Indiana Experiment Station fed 224 lambs having an average initial weight of 59.5 pounds. These lambs were on feed 120 days and required 407 pounds of concentrates and 806 pounds of roughage per 100 pounds of gain. The following year 199 lambs having an initial weight of 56.1 pounds were fed. These lambs in a 90-day feeding period consumed, on an average, 404 pounds of concentrates and 828 pounds of roughage. Again, in the

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3 Indiana Experiment Station Bulletin 202.
4 Indiana Experiment Station Bulletin 221.
wintertime of 1921-22, 200 lambs having an average initial weight of 61 pounds, and which were kept on feed 90 days, took 361 pounds of concentrates and 877 pounds of roughage. In these Indiana experiments, corn was the principal concentrate and silage constituted approximately one-half to three-quarters of the roughage.

The Nebraska Experiment Station reports that during a 65-day feeding period in the winter of 1914-15 a lot of 50 lambs required 367 pounds of shelled corn and 238 pounds of alfalfa hay per 100 pounds gain, while another lot of 50 lambs required 366 pounds of shelled corn, 205 pounds of alfalfa hay, and 121 pounds of corn silage. The initial weight of these lambs was 53 pounds. The same station reported that in a feeding test, in the fall and winter of 1917, one lot of 35 lambs having an average initial weight of 58.5 pounds kept on feed 58 days required only 298 pounds of shelled corn together with 612 pounds of alfalfa hay for 100 pounds gain.

It will be noted that these Nebraska lambs were comparatively light and their short feeding periods favored rapid gains that were unusually economical in feed requirements.

Financing the Sheep Industry.

In the raising of sheep as in other lines of production, it is the exception rather than the rule that the man in position to give his time and efforts to the industry has sufficient capital of his own to enable him to produce on a profitable scale. This is, of course, particularly true of the rancher, who specializes in sheep production, as contrasted with the operator of a diversified farm who raises sheep more or less as a side line to his general farming.

Suitable credit facilities for the sheep producer constitute a part of the larger problem of livestock credit. As compared with cattle, sheep as security for loans are frequently looked upon with rather less favor. Advantages and disadvantages of these two classes of livestock security appear, however, to be fairly well balanced. An important consideration in favor of sheep is that they mature and are ready for market in about one-fourth the time required for beef cattle. Furthermore, the wool clip in the spring provides an income usually sufficient to cover much, if not the whole, of the maintenance cost. Sheep loans, therefore, liquidate themselves much more quickly than do cattle loans, so far as flocks or herds of breeding animals are concerned. On the other hand, sheep are more subject to sudden loss by reason of inclement weather and depredations of beasts of prey. Sheep are also less readily identified, since they can not be branded in the manner so successfully used with cattle.

The sources of credit for sheep producers are commercial banks, wool warehouse companies, and specialized credit agencies generally known as livestock loan companies. While some livestock loan companies lend money on cattle exclusively, others specialize to a considerable extent in sheep loans. In amount the credit extended is usually limited to two-thirds, or at most three-fourths, of the value of the flock. Occasionally, however, loans more nearly approaching actual value are granted where the owner is a man of established
business integrity and well equipped in all respects to handle his flocks to best advantage. In such cases the relatively certain and rapid increase in the growth and value of the flock is held to justify a temporary disregard of the usual margin between the amount of the loan and the value of the security.

In the past the credit facilities have been adapted to the needs of the feeder or finisher of livestock rather than to those of the grower. The term of the loan rarely exceeded six months. In the case of the grower or producer of livestock, one or more renewals have generally been expected by both parties to the credit agreement, and in normal times such renewals have, of course, readily been obtained. The difficulty has been that in times of financial stress, such as followed our period of war and post-war inflation, a sudden consciousness of overextended credits gave rise to more or less frantic efforts at retrenchment and liquidation. At such times the rancher has often found his loans falling due and renewals refused him, making it necessary to sacrifice his flocks at heavy loss to himself and to the detriment of the industry.

It seems reasonable to expect that the added credit facilities established and authorized by the agricultural credits act of 1923 will, in large measure, remove the credit difficulties under which the livestock grower has labored. The extension of the term of discount by the Federal reserve banks on agricultural and livestock paper from 6 months to 9 months, and the creation of 12 Federal intermediate credit banks with their powers to make discounts and advances for periods of 6 months to 3 years, should make available to the livestock interests, as well as to agriculture in general, a more ample supply of credit under all conditions and greatly reduce the necessity of relying on frequent renewals of technically short-term loans. The same act also authorizes the organization under Federal charter of privately financed and managed national agricultural credit corporations which have in view primarily the credit needs of the rancher or livestock man.

Marketing Sheep and Wool.

Sheep raising involves the production of both wool and mutton, each of which constitutes a distinct commodity. While there is always a close correlation and interdependence between these two commodities, they differ so widely in nature, use, price, and ultimate distribution, that it is not only desirable but necessary to consider them separately.

The problem is still further complicated by the shifts in relative importance which have occurred in the course of development of the industry. In the early history of the United States sheep were raised almost exclusively for wool. Later mutton became an important market commodity, whereas more recently the production of lamb has assumed a dominating place in the industry. In 1899 sales of sheep and lambs provided 52.3% of the flock receipts in the United States and sales of wool 47.7%. In 1909 the percentages stood at 56.4% and 43.6% respectively, and in 1919 they were 56.6% and 43.4%.

As late as the middle of the last century wool was so preeminently the reason for the existence of the sheep industry that when, because of a depressed market for that commodity many sheep men
abandoned the business, whole flocks were slaughtered and the carcases fed to hogs. In contrast to this are the prices paid in February, 1924. During that month the market value of an average weight fleece of wool was about $4.12. The live sheep weighing 90 pounds was worth $7.88 and the mutton carcass $4.81. A live 80-pound lamb, however, was valued at $11.96 and the carcass of dressed lamb resulting from its slaughter $9.04.

Wool is a commodity which enters into world trade and its price is, in general, determined by world conditions of supply and demand. Mutton, however, so far as the United States is concerned, is almost wholly dependent on the domestic market, as the people of this country prefer strictly fresh, rather than frozen, lamb and mutton. Furthermore, the character of mutton is such that, without freezing, it can not be stored satisfactorily for more than two or three weeks.

![Diagram](https://example.com/diagram.png)

Fig. 34.—Owing to large numbers of sheep on the western range, the center of mutton production is nearly 700 miles west of the center of slaughter. The center of consumption is close to the center of human population, and only about 200 miles east of the center of slaughter. In reality, the regions of greatest consumption are the North Atlantic States and the far West.

Because of this difficulty in keeping fresh lamb and mutton in merchantable condition for any considerable time, and despite the fact that during the last 40 years the center of sheep production has been farther removed from the center of consumption than has been true of any other class of meat animals, and despite the further fact that heavy loss through shrinkage and other causes results from long hauls, live sheep and lambs are frequently transported nearly across the continent in order that they may be slaughtered and dressed as near the point of consumption as possible (fig. 34).

Marketing Sheep and Lambs.

Although very early in the history of America some sheep were slaughtered, the production of mutton was merely incidental to the major enterprise of producing wool with which to clothe the colonists' families. For many years there was a decided prejudice against mutton as food. This prejudice still exists to a marked degree in many rural communities, particularly in the more sparsely settled portions of the South and Central West. Apparently this
prejudice is due largely to inefficient and unsatisfactory methods of
slaughter and dressing. Another reason for the existence of such
prejudice in the early days was the fact that most of the sheep
raised were not of the mutton type, and did not produce meat of
the best quality and flavor. Still another reason was that most
sheep were not slaughtered until they were 4 or 5 years old, when
the meat was likely to be tough and unpalatable. Even after the
fine-wool breeds were crossed with sheep of the mutton type for the
purpose of producing a better animal for slaughter, it was many
years before mutton became an important item of trade. Up to the
middle of the last century mutton was of so little consequence that
when flocks were slaughtered, on account of the wool prices falling
below the cost of production, the pelt and the tallow were the only
portions of the animal salvaged. The larger centers of population
have always furnished the principal market for lamb and mutton.

The consumption of mutton increased greatly after 1870. This
increase was due partly to improved methods of slaughter, but chiefly
to the development of artificial refrigeration and more particularly
refrigerated transportation. The invention of refrigeration made it
possible to slaughter sheep and lambs in the Middle West and trans-
port the carcass meat by rail to the Atlantic coast cities. From that
time on the sheepman had two strings to his bow, and was no longer
wholly dependent on wool for his flock returns. The first change
from a strictly wool basis consisted largely in an effort to market
ewes in a fairly merchantable condition after they had outlived their
usefulness for breeding purposes, and to market wether sheep after
they had produced from four to five clips of wool.

Although some lambs were marketed in the nineties they were of
so little consequence as a market commodity that no sustained or
continuous price quotation records were kept. By 1900, "lamb" had
taken a permanent place as an article of commerce and provided the
sheepman with a third item of revenue. Since that time lamb mar-
keting has increased greatly. Lambs now constitute from 75 to 90
per cent of the receipts of ovine stock at the principal livestock
markets.

One of the striking features of the sheep industry of the last 30
or 40 years is the progressive lowering of the slaughter age. This
same tendency is also shown in the cattle and swine industries.
Whether the demand for meat from younger animals was responsible
for changing production methods, or whether producers developed
this demand by slaughtering at an earlier age, it would be difficult
to say. In any event, the tendency to market and slaughter animals
at a progressively younger age has fitted in well with the producers' 
increasing costs as well as with the taste of the consuming public.
Whereas in 1890 probably 75 per cent of the ovine stock marketed
consisted of sheep ranging from 4 to 8 years of age, at the present
time approximately 80 per cent of such marketings are lambs ranging
from 4 to 12 months old.

Receipts at the public stockyards.—From 30 to 90 per cent of the
sheep and lambs marketed in different sections of the country are
sent to public stockyards, and probably in the country as a whole
fully 75 per cent of the marketing is conducted in this manner. Al-
though practically every public stockyard handles some sheep, as
might be expected, the bulk of the offerings goes to those markets
which are either located nearest the areas of production or are situated on the direct route from the producing areas of range States to the consuming centers along the Atlantic seaboard.

During the nine years from 1915 to 1923 the receipts of sheep and lambs at public stockyards averaged about 22,353,000 head annually. The peak was reached in 1919 when 27,256,000 head were marketed. The lightest movement occurred in 1915 when receipts totaled only 18,435,000 head. At that time the World War had been in operation nearly a year and the resulting advance in wool prices provided a strong incentive to retain a much larger proportion of ewe lambs than usual.

As is true of other classes of meat animals, a very large proportion of the sheep and lambs marketed pass through a few of the larger markets. For example, during the nine years from 1915 to 1923 five markets, Chicago, Omaha, Denver, Kansas City and Jersey City, received more than 54 per cent of the total number of sheep and lambs sent to public stockyards in the country. Of the total, Chicago handled 19 per cent, Omaha 14 per cent, Denver and Kansas City each 7½ per cent, and Jersey City about 6 per cent (fig. 35).

Seasonal variation in receipts.—The marketing of sheep and lambs is largely a seasonal matter. This is especially true of lambs, because so large a percentage are marketed as grass-fed stock. When the grass season ends they must go to market. Using the eight years, 1916–1923 as a basis, October stands out as the month of heaviest receipts of sheep and lambs at public markets. During the period mentioned 14.4 per cent were marketed in October. September was second with 12.6 per cent; whereas August and November were tied with 10 per cent each. February was the lightest month with 5.8 per cent, followed by April and March with 5.9 and 6 per cent, respectively. The percentage marketed during each of the remaining five months varied from 6.6 to 7.6 per cent (fig. 36).
Source of market lambs.—The first range lambs to arrive in numbers are the lambs born in sheds in Idaho, Oregon and Washington. They begin coming to market by the middle of June and continue through July. During the next three months the movement from the range increases steadily until it reaches its peak in October. Some lambs are marketed from the range in November, but in many of the heaviest-producing areas winter storms and destruction of summer forage have sent the bulk of stock to market before that time. In October and November many farm sheep and lambs go to market for similar reasons. In December receipts consist largely of short-fed stock, which were bought late in the summer or early in the fall and sent out to clean up stubble fields and farm roughage, and lambs which have been fattened in cornfields. In January most lambs coming to market are from feed lots. In February, March, and part of April practically all of the lambs come from feed lots. In very recent years California spring lambs, which are marketed in April and May,

MONTHLY RECEIPTS OF SHEEP AND LAMBS AT 67 MARKETS; AVERAGE OF 1916-1921 COMPARED WITH 1922.

![Graph showing monthly receipts of sheep and lambs at 67 markets, 1916-1921 compared with 1922.]

Fig. 36.—October is usually the month of heaviest movements of sheep and lambs. Over a period of eight years October receipts constituted 14.4 per cent of the total movement for the year. February is generally the lightest month, though March and April frequently show movements fully as light as the shortest month of the year.

have become an important factor. These are followed by the early lambs from Tennessee and Kentucky, which are marketed in considerable numbers in May and June. In fact, lambs from these two widely separated producing areas are frequently offered on the market at the same time. By the middle of June the northwestern “shed lambs” have again started to market.

Feeder sheep shipments.—Not all the sheep and lambs marketed are slaughtered immediately, a considerable proportion of them being returned to the country for further finishing. During the eight years 1916-1923, the number of feeders shipped out of central markets varied from 6,956,000 in 1919 to 3,095,000 in 1921. The movement for 1923 was 4,478,000 head. Combined feeder shipments for the eight years constituted 20 per cent of the receipts (figs. 35 and 37). The different markets vary widely in importance as distributing centers for feeder sheep. On the basis of number reshipped, Omaha is the leading feeder-sheep market of the country with average an-
AVERAGE YEARLY STOCKER AND FEEDER SHIPMENTS
SHEEP AND LAMBS FROM STOCKYARDS, 1916-1921

CITY

Chicago, Ill.

Denver, Colo.

Omaha, Neb.

Kansas City, Mo.

St. Louis, Mo.

New York City, N.Y.


Other

NUMBER

1,655,000

1,016,000

745,458

479,281

361,000

322,000

250,000

3,169,000

Fig. 37.—Omaha is the leading distributing point for feeder sheep and lambs. Denver shipments go largely to feed yards in eastern Colorado and Nebraska. Chicago, which ranks third, is the main distributing point for the eastern Corn Belt. Kansas City receives large numbers of sheep and lambs from the Southwest, which are distributed for feeding in the lower Missouri Valley. During the six years, 1916-1921, these four markets handled 79 per cent of the feeder sheep and lambs that passed through public stockyards. The circles in the map above represent a much smaller number of sheep for the same area of circle than in fig. 35. Annual shipments during the above eight years of 1,143,236 head. Denver is second with 1,016,324, Chicago third with 745,458, and Kansas City fourth, with 479,281 head. These four markets handle nearly 74 per cent of the feeder sheep and lambs that pass through public stockyards. On the basis of percentage of receipts which are returned to the country as feeders, Denver stands out preeminently. During the eight years mentioned Denver reshipped 56 per cent of its receipts as feeders or breeders; Omaha 37 per cent; Kansas City 28

Fig. 38.—The majority of the range sheep are shipped east for slaughter to the large packing houses at Chicago and Missouri River points, all of which are under Federal inspection. Most of the sheep and lambs from the Central States are also slaughtered at these plants. A large proportion of the dressed carcasses are then shipped east for consumption in the industrial centers. The packing houses on the Atlantic coast depend upon the States from Ohio and Michigan eastward for their supplies.
The Sheeny Industry, per cent, and Chicago 17 per cent. These four markets combined shipped 31 per cent of their receipts back to the country.

Feeder-sheep shipments are largely confined to the four months August to November, during which time more than 70 per cent of such shipments from central markets usually occur. The heaviest movement takes place in September and October, when the movement of range sheep to market is at its height. Nearly 45 per cent of the feeder shipments for the year occur in these two months. March is the month of lowest shipments.

While the greater number of the feeder lambs pass through central markets, a considerable number are sent direct from the range to feed lots. In some years these feeder lambs are contracted for several months in advance.

Concentration of slaughter.—Sheep and lamb slaughter is more centralized than the receipts figures indicate. Considering total slaughtered, both federally inspected and otherwise, during the four years 1920 to 1923, the four markets, Chicago, Jersey City, Omaha, and Kansas City slaughtered over 63 per cent. During that period Chicago slaughtered 26 per cent of the total, Omaha and Jersey City each 14 per cent, and Kansas City 10 per cent. A larger proportion of the sheep and lambs slaughtered in the United States are handled under Federal inspection than of any other class of livestock. Out of a total slaughter in 1923 amounting to 14,818,200, 11,528,550, or 78 per cent were slaughtered under Federal inspection. In that same year only 66 per cent of the cattle and 65 per cent of the hogs slaughtered were federally inspected (fig. 38).

The slaughter of sheep and lambs on farms is comparatively light (fig. 39). Such slaughter in 1919 totaled only 434,533 or 3 per cent of the total slaughter of sheep and lambs for that year. The comparatively small size of sheep and lambs makes them especially suitable for farm slaughter, as there is little difficulty in disposing of all the meat while it is still in prime condition. However, sheep

*The bulk of slaughter credited to Jersey City actually occurs in Greater New York.
raisers of the farm States have not formed the habit of depending very largely on lamb or mutton for their meat supply. In recent years the relatively high prices of market lambs has naturally encouraged farmers to sell their lambs and slaughter lower-priced beef and pork for home use. Comparatively few local butchers in the smaller towns and villages of the Middle West handle lamb and mutton regularly. These meats are consumed mostly in restaurants, hotels, and city homes of industrial centers.

Market Prices of Sheep and Lambs.

The more important factors which determine the market price of sheep and lambs are available supplies, consumptive demand, grade of the animal, and the price of wool.

Available supplies.—As previously noted, the supply of sheep and lambs at market centers varies widely, not only with the season of the year but from year to year. An eighth of the annual receipts usually arrive in each of the two months, September and October, one-tenth each in August and November, and only about one-fifteenth in each of the other eight months. The variation from year to year is less but still very large. During the nine years 1915 to 1923 receipts at public markets show an extreme variation of 8,821,000 head, or about 48 per cent of the receipts in the lowest year. However, this wide variation was largely due to war conditions.

Consumption of lamb and mutton.—The consumption likewise varies from year to year. In the 17-year period for which figures are available, 1907-1923 the per capita consumption ranged from 4.6 pounds in 1917 to 8.2 pounds in 1912, an extreme variation of 3.6 pounds per capita, or more than 74 per cent. The importance of such a variation becomes apparent when the further fact is taken into account that there is practically no foreign trade in lamb and mutton, the sheep producer being dependent almost entirely on domestic consumption for an outlet. Table 1 shows that
the variation in per capita consumption of lamb and mutton, though less in number of pounds from year to year than in other meats, is much greater relatively.

Consumption of lamb and mutton also varies widely in different sections of the country (fig. 40). It is greatest in the northeastern and far western sections, least in the South Atlantic and West North Central States. In the western range country the per capita consumption by the rural population is decidedly greater than in the farm States. This is particularly true of Nevada, New Mexico, Utah, and Wyoming, where the average in 1919 was 22.2 pounds, 15 pounds, 8.3 pounds and 7.8 pounds, respectively. East of the Rocky Mountains the per capita consumption by the rural population averages less than 1 pound.

### Table 1.—Annual per capita consumption of lamb and mutton, beef, veal, pork, and lamb, 1907–1923.

<table>
<thead>
<tr>
<th>Year</th>
<th>Lamb and mutton</th>
<th>Beef</th>
<th>Veal</th>
<th>Pork, excluding lard</th>
<th>Lard</th>
<th>Year</th>
<th>Lamb and mutton</th>
<th>Beef</th>
<th>Veal</th>
<th>Pork, excluding lard</th>
<th>Lard</th>
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<td>6.8</td>
<td>85.4</td>
<td>14.3</td>
<td>1917</td>
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<td>61.1</td>
<td>6.5</td>
<td>58.5</td>
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<td>70.2</td>
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<td>1920</td>
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<td>1922</td>
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### Grades of sheep and lambs.—Although the general price level of sheep and lambs is largely determined by supply and demand conditions combined with the price of wool, the price of any given lot of sheep or lambs depends chiefly on the grade of the animals which comprise the lot. The grade of sheep and lambs intended for slaughter is determined largely by variations in quality, conformation, and finish. Quality refers to the degree of fineness of bone and relative freedom from coarseness. Fineness and character of fleece also sometimes serve as an index of quality. Conformation refers to the general form, build, or outline of the animal. Finish pertains to the amount and distribution of fat. Lambs are graded as prime, choice, good, medium, common, cull, and inferior in the order named; wethers, prime to cull; and ewes, choice to canner. A canner ewe corresponds to an inferior lamb. Lamb prices at Chicago during October, 1923, averaged $12.30 per 100 pounds for those grading medium to prime, and $9.90 for those grading common to inferior. (Fig. 41.)

### Effects of wool prices.—Wool is the third factor which enters strongly into the determination of sheep and lamb prices. Perhaps this commodity is the source of more complications than any other single item. This is due partly to comparatively wide fluctuations in the price of wool, but more particularly to the extreme variations in the amount of wool carried by the animal at various seasons of the year. For example, late in the spring an animal may carry from 5 to 8 pounds of wool. If wool is worth 40 cents a pound the value of the fleece alone will range from $2 to $3.20. Assuming a weight of 85
pounds for the lamb and a price of 12 cents a pound, the total value of the animal would amount to $10.20. Of this amount, however, from $2 to $3.20 represents the value of the wool that the lamb carries, which amounts to approximately 25 to 30 per cent of the total value of the animal. It may happen, however, that although at a given time the animal carries a greater weight of fleece than it did previously, the price of wool has declined in the meantime so that

MARKET GRADES OF LAMBS.

Fig. 41.—Conformation, quality, and finish largely determine the market grades of lambs. Experienced buyers when considering wooled lambs seldom determine grade solely on observation; they invariably handle the animals to discover deficiencies and to determine the degree of fatness or finish. The above cuts illustrate three grades of lambs before and after shearing: A, Choice lamb (wooled); B, choice lamb (shorn); C, medium lamb (wooled); D, medium lamb (shorn); E, cull lamb (wooled); F, cull lamb (shorn).

the increased amount of wool may be worth no more than the smaller amount earlier in the season.

Long-time variations in prices.—In studying sheep and lamb prices over a period of time, one characteristic stands out strongly. Largely because of the fact that lamb and mutton still are considered by some people as luxuries, lamb and sheep prices show a much greater sensitivity to variations in general business, trade, and economic conditions than do most commodities.
A study of yearly average sheep prices at Chicago from 1893 to 1923 inclusive, indicates that average prices reached their lowest point in 1894, the price for that year being $2.80 per 100 pounds. The highest price occurred in 1918 when the average for the year stood at $12.15. Lamb prices followed a virtually parallel course. For 1894, the Chicago average price was $3.55, and in 1918 it was $16.60 per 100 pounds (fig. 43).

Fig. 42.—Although a lamb carcass produces fewer retail cuts than either beef or pork, a larger proportion of it is used as chops than in true of any other class of meat. This fact, together with the comparatively small size of the various retail cuts, makes lamb particularly suited to the needs of small families and to the mode of living of the average city dweller.

A comparison of both of these sets of prices with indexes of general commodity prices shows that whereas the sheep and lamb market reached the lowest point in 1894, general commodity prices did not reach bottom until two years later, or in 1896. The highest point in the sheep and lamb market was touched in 1918, whereas general commodities did not reach the peak until two years later, or in 1920. This would seem to indicate that, in general, the sheep and lamb market anticipates rather than follows fluctuations in general trade conditions.
YEARLY AVERAGE PRICE OF LAMBS AT CHICAGO, 1893-1922, INCLUSIVE, AND PURCHASING POWER IN TERMS OF THE 1913 DOLLAR.

It may be of value in this connection to compare actual market prices with the purchasing power of such prices expressed in terms of general commodity prices. In the case of sheep, although the lowest market price was registered in 1894, the lowest purchasing power occurred in 1921. On the other hand, both the highest price and the highest purchasing power occurred in 1918. In the case of lambs the situation was somewhat different. Both the lowest market price and the lowest purchasing power of the period considered occurred in 1894. Although the highest market price occurred in 1918, the highest purchasing power was reached in 1922.


Fig. 44.—Prices of lambs in 1923 were almost double the average price for 1911-1915, which years are fairly representative of pre-war prices, and were nearly as high as the average price during the period 1916-1920. Lamb prices usually reach their seasonal peak in May, though in 1923 the high point occurred about the middle of June. The lowest quotations generally occur in June, owing partly to the fact that many of the lambs going to market at that time are clipped.
Not only are sheep and lamb prices subject to sudden fluctuations, but over a period of time such variations are extremely wide. For example, in the 31 years, 1893 to 1923, yearly average sheep prices varied from $2.80 to $12.15 per 100 pounds—a range of $9.35, or 334 per cent, using the lower number as a base. Lamb prices during the same period varied from $3.55 to $16.60—a range of $13.05 or 368 per cent.

Seasonal variations in prices.—As is true of market movements of sheep and lambs, so also market prices move in fairly well-defined cycles. Some of these cycles as noted are dependent chiefly on changes in general economic conditions. Others depend largely on seasonal supply conditions.

A study of weekly average prices of lambs at Chicago for two 5-year periods, 1911 to 1915 and 1916 to 1920, shows that, as a rule, prices are lowest somewhere between the middle and the end of June, and highest around the middle of May (fig. 44). It seems probable, however, that this close proximity of the highest and lowest prices of the year is more apparent than real. By the middle of June most of the lambs coming to market are shorn, whereas a month earlier the bulk of the lambs carry a full fleece. The importance of this feature becomes apparent when shorn lambs first reach the market. The difference between wooled and shorn stock frequently amounts to as much as $1 or $1.50 per 100 pounds and sometimes more.

Because of the varying quantities of wool carried by animals at different seasons of the year, it seems probable that dressed-lamb prices should serve as a better index of the trend of true lamb prices than do the quoted prices of live lambs. Such a study of weekly average lamb prices at New York City over a period of years indicates that, as a rule, dressed lamb prices reach their peak in March or April.
and are lowest in September and October. This corresponds very closely with normal fluctuations in market supplies. Live lamb prices average highest in May, not only because the supply is small and a large portion of the lambs at that time carry full fleeces, but also because virtually all of the lambs marketed at this season of the year are either lambs which have been on feed for several months and are therefore in a finished condition, or are spring lambs which sell at a premium because they are relatively scarce.

Abnormal variations in prices.—No study of present-day sheep and lamb marketing would be complete that did not include some reference to the period of liquidation which occurred during 1920 and 1921. Sheep and lamb prices started downward from five to nine months earlier than those of cattle and hogs. This decline had been preceded by an abrupt collapse of the wool market, which in turn caused a heavy liquidation and a glutting of the mutton market. The lamb market was further demoralized by heavy importations of lamb and mutton from New Zealand and Argentina, amounting during 1920 to about 10 per cent of the domestic production.

Lamb prices reached their peak late in January, 1920, when the weekly average at Chicago stood at $20.80 per 100 pounds. From that point, with certain minor fluctuations, the market declined until a low point of $8.35 was reached for the third week in February, 1921. Sheep prices, on the other hand, did not reach their peak until the fourth week in April, 1920, when the weekly average stood at $14.90. From that point, however, the market dropped precipitously, declining approximately $7 per 100 pounds within a 10-weeks period. As was true of lambs, after a slight recovery in July, 1920, sheep prices again moved downward until February, 1921.

It is noteworthy also that despite a decline of $12.45 in 13 months, lamb prices never quite equaled the level of the five pre-war years, 1910 to 1914. Sheep prices, on the other hand, touched that level during the fourth week of December, 1920, and by the first week of the following February had dropped 81 cents below it.

Widening differential between prices of sheep and lambs.—It has already been pointed out that in the course of development of the sheep industry there has been a gradual lowering of the slaughter age. This has been due partly to a change in taste of the consuming public. Relative prices usually serve as an excellent index of relative desirability of different commodities. This is developed rather strikingly by a study of prices over a period of years.

The great bulk of meat animals of the ovine species fall into one or another of three general classes: Sheep, yearlings, and lambs. A comparison of the price of each of these classes from 1899 to 1923 shows that there has been a steady widening of the differential between them. For example, in 1899, yearlings averaged 45 cents per 100 pounds higher than mature sheep, the premium paid for yearlings amounting to 10 per cent of the sheep price. In 1923, however, the year in which the premium was greatest, yearlings brought a premium of $4.05 per 100 pounds, or over 55.5 per cent over sheep.

Following this study a step further, lambs in 1899 brought $1.15 per 100 pounds more than sheep, the premium amounting to 26
The Sheep Industry.

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per cent. In 1921, although the differential was only $4.75, the per cent of premium paid for lambs as compared with sheep amounted to 93 per cent. In 1922 when the differential expressed in dollars was greatest, lambs brought a premium of $6.30 per 100 pounds, or 87 per cent. In 1923 the differential was $6.20 and the premium in favor of lambs 85 per cent.

Problems in Marketing Sheep and Lambs.

One of the greatest problems in marketing sheep and lambs is that of avoiding the congested markets which occur during the three months, August 15 to November 15. During this period the receipts at the leading markets are frequently much greater than can be readily absorbed. As such gluts almost invariably cause a break in prices, all possible steps should be taken to avoid this condition. Probably the greater number of range operators will always find it necessary to ship at this time. There are, however, many operators who can just as well get their lambs on an earlier market, or if the lambs are not suitable for slaughter, hold them in valleys for a few weeks or ship direct to the feed lots. That efforts are being made to avoid shipping during this period of peak supplies is evidenced by the large percentage of the Pacific coast and Idaho growers who aim to market their lambs from April through July.

The autumn congestion is still further aggravated by the large number of native lambs, a large percentage of which are of inferior quality, that are marketed at this time. These inferior native lambs have a decidedly depressing influence on the market. Not only do they hurt the sale of good lambs, but because of their inferior condition due to poor breeding, insufficient feed, internal parasites, or lack of castration and docking, they yield a poor quality of meat and are

HAULING WOOL ACROSS THE PLAINS.

Fig. 46.—In the western range country wool is frequently hauled for a distance of 100 or more miles to the railroad. Owing to its high value per pound, it can be hauled farther than almost any other agricultural commodity.
generally produced at a loss. This problem is one of giving the sheep more and better attention as well as giving more attention to the market requirements.

Sheepmen also are confronted with the problems of relatively high transportation and marketing charges. On some classes of sheep these charges reduce profits to a dangerously small margin.

Marketing Wool.

Wool is one of the important items of world commerce. In the early days virtually every family produced sufficient wool to meet its own needs. There was, therefore, little or no marketing of wool. With the division of labor, however, and the concentration of population in the cities there came the demand for specialization in wool production.

![Diagram](https://via.placeholder.com/150)

**Fig. 47.**—The freight rate in December, 1922, on 100 pounds of wool in the grease from Pocatello, Idaho, to Boston was $2.44; from Pendleton, Oreg., $1.78; and from Portland, Oreg., $1.50. The rate from Salt Lake City, Utah, was $2.36; from Winnemucca, Nev., $2.06; and from San Francisco, $1.50. The rate from Phoenix, Ariz., was $2.61; from Albuquerque, N. Mex., $1.99; from San Angelo, Tex., $2.61; from Kansas City, Mo., $1.24; from St. Louis, Mo., $1.15; and from Columbus, Ohio, 78 cents. The rate from Rawlins, Wyo., was $2.08; from Billings, Mont., $2.12; from Bloomfield, Iowa, $1.08; from Chicago, 99 cents; and from Rochester, N. Y., 52 cents. It appears that the zone of highest freight rates to Boston extends from western Montana and eastern Idaho through Utah and Nevada to Arizona.

Separating the center of production from that of consumption gives rise to marketing. Generally speaking, the farther these two points are from each other the more complicated marketing becomes. Wool generally can be produced more cheaply in regions that are undeveloped agriculturally. Due to its relatively high value per pound it can be transported long distances and still yield a profit to the producer. Because of these facts wool production has been mostly a frontier enterprise. Wool consumption, on the other hand, is greatest in the more densely populated regions. For these reasons it is probable that wool is transported over longer distances than any other important commodity (figs. 46 and 47).

International Trade in Wool.

Nearly half of the world's present supply of wool is produced in the Southern Hemisphere. On the other hand, the greater part of
The heaviest exporters of wool are the sparsely populated, recently developed countries of Australia, Argentina, New Zealand, South Africa, and Uruguay. These countries supply the fine wools. Most of the carpet wools come from China, India, and western Asia. The heaviest importers of wool are the densely populated, industrial countries of western Europe and eastern North America. The wool trade largely centers in Europe. The United States imports much of its wool through London and Liverpool, but a smaller proportion than before the war.
the wool is consumed in the Northern Hemisphere, the latter being much more densely populated. The leading countries in the exportation of wool are Australia, Argentina, New Zealand, British South Africa, and Uruguay, in the order named. (Fig. 48.)

The leading importing countries are the United Kingdom, France, Germany, United States, Belgium, and Japan. The United Kingdom and the United States are both heavy producers and large importers of wool. British India exports considerable quantities of wool, which is mostly carpet wool. It imports, however, nearly as much as it exports, most of the imported wool being used for clothing purposes.

The United Kingdom is the greatest wool-handling country of the world. A large percentage of the colonial wools and also a consider-

SOUTH AMERICAN WOOL ON COMMONWEALTH PIER, BOSTON, MASS.

![Image](image-url)

Fig. 49.—Interior view of Commonwealth Pier, Boston, showing 24,700 bales of South American wool, valued at $12,500,000, just as it was unloaded from the boat on January 28, 1917. The second floor of the pier contained, in addition, wool valued at $1,750,000.

able amount from South America and other countries are shipped to that country for sale. Binonthly auction sales are held at the London Wool Exchange in which a large assortment from all parts of the world is available. While much of the wool is sold for domestic consumption, large quantities are reexported to the United States and to continental Europe. World prices for wools used in the manufacture of clothing are virtually established at the London market. Similar sales are held at Liverpool and other cities. Liverpool is the leading exchange market for carpet wools.

In recent years there has been a growing tendency for the importing countries to buy directly from the exporting countries, and the Australian auction sales have reached considerable importance. The wools of South America are sold largely by private contract. Before
The Sheep Industry.

In the World War most of the wool imported by the United States was purchased on the British markets. In 1919, however, Great Britain stood sixth from the standpoint of exports to this country, Argentina standing first. (Fig. 49.) The following year, however, the United Kingdom was back in second place, where it has since remained.

Although the United States ranks third in the production of wool, the average for the last 35 years amounting to approximately 300,000,000 pounds per annum, it has never produced sufficient quantities to meet its needs. For some years prior to the World War yearly imports of wool to the United States averaged about 200,000,000 pounds. In 1918, the peak year, they amounted to 453,727,000 pounds. Boston, which is the second largest wool market of the world, is preeminently the leading wool market of the country. Receipts of foreign and domestic wool at that point amounted to

507,000,000 pounds in 1917, and 416,000,000 pounds in 1923. In some years Boston handles as much as 75 per cent of the domestic wool and occasionally as high as 70 per cent of the imported wool (fig. 50). Philadelphia handles considerable quantities of domestic and foreign wools, while New York receives considerable quantities of imported wools.9

Methods of Marketing Wool in the United States.

The methods of marketing wool in this country have changed somewhat from time to time, and there are also some variations in differ-

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9 The estimated domestic production, net imports, and estimated consumption of wool for 54 years—1870 to 1923—are shown in Table 546—entitled "Wool, raw: Production, Imports, Exports, and Apparent Consumption, United States, 1870–1923," in Statistical Appendix, page 1001.
ent parts of the country. However, until recent years the general plan of marketing did not differ materially from that in use in the early days of the country.

The more important agencies involved in getting wool from the producer to the consumer are the country buyer, the country assembler, the central market dealer, the commission merchant, the broker, and the manufacturer. In the farm States the country buyer gathers up small lots of wool and either sells them to some merchant in town or holds the wool in his own warehouse. The central market dealer sends his agents through these smaller towns or concentration points and buys such of the wool as is suited to his needs. The wool is then shipped to some large center, where it is graded on the basis of mill requirements, and finally sold to the manufacturers.

Another form of marketing is one in which the growers consign their wool to wool warehouse companies and usually obtain advances amounting to a certain per cent of the market price of their wool. The warehouse company grades the wool and holds it for the inspection and purchase of the broker or mill agent. When the wool is sold the warehouse company remits to the grower the price obtained less any advances that may have been made, interest due on money already advanced, and a certain charge per pound for grading and carrying.

Recently the cooperative idea has been applied to wool marketing. Great quantities of wool are now assembled annually by wool pools which are, generally speaking, cooperative organizations made up of woolgrowers. The wool of the individual growers is assembled and pooled at some point, where it is graded and held for the inspection of wool buyers. Frequently advances are made on the wool so pooled. The buyers, who may represent brokers or mills, visit the points where wool is assembled and bid on the wool either in job lots or by grade, depending upon how the wool has been handled by the pool.

In the range States wool selling is quite different from that in farm flock-regions. Contracting the sale of the clip before shearing has been practiced by many ranchmen, especially when the contract provided for an advance payment, or at times when there appeared to be danger of a decline in wool prices. However, wool growers have usually lost heavily by this system, and in general they now consider it unbusinesslike. Much of the range wool is sold to eastern dealers at shearing time or very soon thereafter, the buyers dealing directly with the wool grower at his shearing shed or warehouse. This method is sometimes handled by sealed bids, each buyer offering his bid under seal, each ranchman or group of ranchmen reserving the right to accept or reject any or all bids. Much wool from the range is also consigned to commission houses in large wool centers, most of it going to Boston, Philadelphia, Chicago, St. Louis, and other Missouri River points. Part of that consigned from the Washington-Oregon-Idaho district goes to Portland, Oreg.

Much effort has been spent in attempts to work out systems of cooperative marketing of range wool, and considerable progress has been made, though naturally the movement has not developed to the same point in the range country that it has in some of the farm-flock areas. Many systems have been tried out, ranging from very simple and temporary organizations handling sealed bids that are accepted
Fig. 51.—By introducing new strains and by careful selection for heavy shearing qualities in the breeding flocks, woolgrowers have increased the average fleece weight from about 2 pounds in 1840 to 7 or 8 pounds by 1920 in Vermont, the Mid-West and the far Northwest. In New Mexico the average fleece weight has increased from about 2 pounds in 1880 to almost 6 pounds at present.

Fig. 52.—In recent years fleece weights of 7 or 8 pounds are the rule, except in the Southeastern States, where the weight ranges from 3 to 5 pounds, and in the North Atlantic States, where the average fleece ranges from 5 to 7 pounds. The weight of the fleece varies somewhat from year to year, depending upon feed and climatic conditions.
WOOL. AVERAGE WEIGHT OF SCOURCED FLEECE
AVERAGE 1920-22

Fig. 53.—Fleeces from the desert range shrink on scouring about 60 to 70 per cent, while fleeces from the farming States shrink only about 40 to 50 per cent. The heaviest fleeces in the grease come from the northern range States (fig. 52), whereas the heaviest fleeces after scouring are from the North Central States. It is worthy of note that the southwestern fleeces are little heavier than those from the Southeast after scouring.

or rejected by the sales committee, to permanent, incorporated organizations serving in the capacity of commission houses and dealing on the basis of binding, legal contracts with the growers. When the wool market is in a healthy condition there is a fair degree of competition among buyers in those parts of the range area that yield large quantities of desirable wool, and a number of buyers are attracted to a given community. The results of some of the cooperative selling indicate that it helps to make competition among buyers even more keen and facilitates business-like transactions. It promises also to alleviate, to a certain degree, heavy overloading and serious depression of the market.

A striking peculiarity of the wool market of the United States is the fact that although from 550,000,000 pounds to 750,000,000 pounds

Fig. 54.—The farm value of fleeces is usually highest in Ohio and Montana, followed by Oregon and Michigan, and is lowest in the Southeastern States. In the other States the average farm value of fleeces ranged mostly between $2 and $3 in 1923.
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of wool with a total valuation ranging from $112,000,000 to $350,000,000 are handled annually, there is no established public market for the commodity. Practically all of this vast quantity of wool is bought and sold by private agreement. Another peculiarity is that while there is no open public or auction market a very large proportion of the wool passes through two or three leading centers. In other words, the marketing of wool is probably more concentrated than that of any other important commodity.

Grades of Wool and Their Uses.

Wool is extremely complex and varied in its characteristics. As a commodity of commerce it is one of the most difficult to classify and grade for the systematizing of trade. While the variation in wool occurs somewhat in correlation with the types and breeds of sheep, wide variations exist within the breeds. Fleeces having the same fineness (diameter of fiber) often vary greatly in strength of fiber, spinning properties, length, and the contents of grease (natural wool oil) and dirt. Soil, climate, and feed have far-reaching influence on the production of wool. In some sections of the western range where grass is sparse and sand storms are frequent, fleeces of Merino or Rambouillet sheep may shrink as much as 65 to 75 per cent or more in grease and dirt, when scoured or cleaned preparatory to manufacture, while fleeces from sheep of these same types when grown on excellent bluegrass pastures where sand storms seldom, if ever, occur, may shrink only 50 to 60 per cent (figs. 52 and 53). Such characteristics as strength of fiber, spinning property, and length of staple are also affected by the conditions of soil, climate, and feed.

Commercial grades of wool are based primarily on fineness or diameter of fiber. The very finest of wool is known by the grade term "fine." Wool of this grade is produced by Merino or Rambouillet sheep. "Half-blood" wool is the next grade coarser than fine, but it is commonly considered a fine wool; that is, the fibers have smaller diameter than those of the wool which is commonly called medium wool. A large percentage of the half-blood wool is grown on sheep having considerable Merino or Rambouillet inheritance. It should be understood that the word "blood" is a wool grade term and has no reference to the breeding of the sheep, but the use of a fraction in connection with the word blood indicates a certain fineness or diameter of fiber. "Three-eighths blood" is the finest and "quarter blood" the coarsest of what is known as medium wool. These grades are produced chiefly by the medium-wool mutton breeds such as Southdowns, Shropshires, and Hampshires; also by the cross-breds resulting from mating the fine and long-wool breeds, which is extensively done on the western range. "Low-quarter blood" is coarser than "quarter blood," but the finest of what is known as coarse wool. "Common" is medium in coarseness, and "braid" the coarsest of coarse wool. Oxfords produce a great deal of "low-quarter blood" as well as "quarter blood," and all grades of coarse wool are grown on the long-wool breeds, such as Lincolns, Leicesters, and Cotswolds.

Fine and half-blood wools are used in the finest of dress goods, and choice wool of these grades is usually in strong demand. The modern tendency toward mutton production is increasing the propor-
tion of three-eighths and quarter-blood wools, and in a relative sense the supply of fine and half-blood is being reduced. The three-eighths and quarter-blood wools are used in the manufacture of coarser clothing for which there is a large demand under normal conditions.

Low-quarter blood, common, and braid are used in the coarsest of goods such as heavy overcoating, blankets, and carpets. Both demand and prices for the three coarsest grades are less, and they are not produced so abundantly in America as the fine and medium wools. Wool of good length (about 2½ to 3 inches long) is desired for the manufacture of choice, durable worsted goods. When wool has fibers only about 1 to 2 inches long, it is used largely in the manufacture of woolens or flannels.

Grading of wool by the grower was very uncommon in this country prior to the World War. There is to-day, however, a marked tendency on the part of those who pool or consign their wool to sell by grade. Selling any commodity ungraded is bound, in the long run, to work to the advantage of the buyer. This must be true because the buyer is naturally in a better position to judge the true value of ungraded commodities than is the average producer. The United States Department of Agriculture has established grades for wool based on diameter of fiber.

Prices of Wool.

Wool prices, like those of sheep and lambs, have followed a rather tortuous course during a period of years. Fluctuations in wool prices, while not so wide as those for mutton and lamb, have exceeded in extent and violence those in most other important commodities. One reason for these wide variations is the fact that wool is a world commodity and its price level is, to a considerable extent, determined by world conditions of supply and demand. Another reason is the fact that almost from the founding of the country wool has been the

![YEARLY AVERAGE PRICE, PRODUCTION, AND IMPORTS OF WOOL, 1890-1922; PERCENTAGE OF THE AVERAGE FOR 1909-1914.](image)

Fig. 55.—As a rule there is a close relationship between wool prices and imports into the United States. Both prices and imports reached their highest points in 1918. Domestic production of wool has been fairly constant during the past 30 years.
subject of various legislative enactments. Probably no tariff bill has been enacted in the United States that did not either impose, raise, lower, or eliminate import duties on wool. These artificial influences have had a tendency to modify the natural play of economic forces, and have resulted in materially changing available supplies of wool in the United States and, therefore, in raising or lowering prices (fig. 55).

A study of yearly average prices of medium-grade wool over a period of 100 years shows that the market averaged lowest in 1896, when washed, medium, Ohio fleece wool was quoted in eastern markets at 19.5 cents a pound; and was highest in 1918, when the same grade averaged 91.5 cents. The range between these two extremes amounted to 72 cents or 369 per cent (fig. 56).

If the market price of the above-named grade of wool is compared with its purchasing power in terms of all commodities, one is likely to be impressed with the rather close correlation which, under normal conditions, exists between the two. Although the market price and the relative price are rarely identical, it is believed that during a period of time the purchasing power of wool comes as near equaling the market price as do most important agricultural commodities. In other words, the wool market is, generally speaking, a fair index of the general level of commodity prices.

In 17 of the first 18 years beginning with 1824, the market price of wool exceeded somewhat its purchasing power in terms of other commodities. During the next 20 years, however, the purchasing power exceeded the market price. During the Civil War although wool prices advanced sharply they did not keep pace with prices of other commodities. By 1877 the market price had again dropped below the purchasing power and remained so until 1912. From 1915 through 1923 the market price was consistently higher than the purchasing power (figs. 55 and 57).
YEARLY AVERAGE PRICE OF "UNWASHED" OHIO FINE WOOL AND 3/8 BLOOD, AT BOSTON; AND PURCHASING POWER IN TERMS OF THE 1913 DOLLAR, 1890-1922.

Fig. 57.—The trend of wool prices was downward from 1890 to 1896, upward from that year to 1905, fairly stable till 1909, and then slightly downward until 1914. In the latter year a sharp advance began which culminated in 1918. The purchasing power of wool in terms of the 1913 dollar exceeded the money price until about 1910. In 1915 a wide divergence between the two began, and for the peak year of 1918 the yearly average price of 77 cents had a purchasing power of only 40 cents in terms of all commodities. In 1923 the average money price was 55 cents and the purchasing-power price was 36 cents. These 1923 figures were received too late to include in the graph.

War invariably stimulates the demand for wool, and therefore advances prices. During the Civil War period wool sold up to $1 a pound. In 1867 the market broke sharply, but during 1871 and 1872 prices rose to a relatively high level, the Franco-Prussian War in Europe being an important factor in the advance. In 1873 a business panic occurred, and from that time until 1879 wool prices declined rather steadily. The revival of business which occurred in 1879 resulted temporarily in higher prices for wool, but with

MONTHLY AVERAGE PRICE OF "TERRITORY" AND "FLEECE" WOOL AT BOSTON, 1910-1923.

Fig. 58.—Wool prices were fairly steady from 1910 to 1914. In 1915 the market started definitely upward and, so far as medium grades were concerned, reached the peak in 1918. After a secondary advance during the speculative period of 1919 prices broke sharply and reached the low point about the middle of 1921. Since 1921 prices have more than doubled.
certain fluctuations, wool prices declined after 1880. By this time increased wool production in the Southern Hemisphere began to have its effect on wool markets and by the middle eighties there was a pronounced decline in wool prices, and the panic of 1893 hastened this downward movement. In the next few years the prices increased slightly. However, the average for the period of 1901 to 1910 was lower than that of the years from 1840 to 1890, if the Civil War period be excluded. In 1913 the trend of wool prices was downward, but there was a recovery in the following year.

During the World War prices broke all previous records, fine staple territory wool on a scoured basis at one time selling at $1.85 per pound at Boston. On the signing of the armistice, prices broke but recovered rather quickly after the reopening of the London wool sales in April, 1919. During February and March, 1920, prices advanced to $2.05 per pound. Presently the market turned extremely dull and prices started downward. As a matter of fact, quotations from June to December of that year were largely nominal, there being but few actual sales.

Although the wool trade revived somewhat in 1921, prices were comparatively low. The average price at Boston of three-eighths blood, unwashed Ohio and Pennsylvania wool was 26 cents a pound for the three months, July, August, and September. The average price for the year was 28 cents compared with 53 cents in 1920, 67 cents in 1919, and 77 cents in 1918. Toward the end of the year trade improved and prices advanced somewhat. Generally speaking, the market was active throughout 1922 and 1923. The average price for the full year 1922 was 17 cents higher than that of 1921; and the average for 1923, 10 cents higher than 1922, or 27 cents over that of 1921 (fig. 58).

Problems in Marketing Wool.

Largely because of the dual character of the industry in which he is engaged, the sheepman probably is confronted with more serious marketing problems than either the cattle or hog producer. To conduct his marketing intelligently, the sheepman must keep in touch with conditions prevailing in two markets which differ widely in almost every respect. One of the commodities which he produces enters extensively into world trade. The other depends for an outlet almost entirely on domestic requirements.

In general, prices for wool and those for dressed lamb and mutton follow somewhat parallel courses (fig. 59). This is probably due largely to the fact that although wool is more of a necessity than lamb and mutton, the prices of both, as a rule, follow rather closely the trend of general business prosperity or depression.

Wool, although a world commodity, is imported rather than exported. The sheepman therefore is vitally concerned with any import duties which may be imposed on foreign wool and in the removal or modification of such duty.

Another problem with which the sheepmen must deal is the lack of an open public wool market corresponding with the London wool
The relationship between prices of live and dressed lambs is usually very close and fluctuations in the one are, as a rule, very promptly reflected in the other. Wool prices are subject to less sudden fluctuations than either live or dressed lamb, showing usually rather broad upward and downward swings. These broad movements in wool prices, however, have a rather pronounced effect on the trend of live lamb prices, and fluctuations in live lamb prices are quickly reflected in the dressed-lamb market. It should be noted that the percentage increase in price of wool during the war years was little, if any, greater than the percentage increase in price of lambs.
auction sales. During the World War the Government assumed control of all wool stocks in the country, and after the war considerable quantities were disposed of by the auction sale method. The prevailing system of disposing of wool by private sale makes it difficult for the wool grower to obtain accurate information concerning the market price for a given grade of wool.

Another problem consists in the fact that until quite recently most wool growers sold their product ungraded, the grading being done in the larger wool centers by brokers, whose business it was to sort and grade the wool in accordance with the requirements of the different mills. Under this system the grower who produced relatively clean wool of high quality was frequently penalized because his wool was purchased in a lot with that of other less careful growers.

The following table shows the number of fleeces required to buy a suit of clothes at different times:

<table>
<thead>
<tr>
<th>Ticket of Fleece</th>
<th>Retail Price of Man's Suit</th>
<th>Number of Fleece to Buy a Suit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1914 --- $1.30</td>
<td>$14.00</td>
<td>10</td>
</tr>
<tr>
<td>1920 --- $1.53</td>
<td>$41.00</td>
<td>20</td>
</tr>
<tr>
<td>1922 --- $2.47</td>
<td>$28.00</td>
<td>30</td>
</tr>
</tbody>
</table>

**Fig. 60.**—In 1914, when wool and clothing were both comparatively cheap, the farmer needed 11 fleeces to exchange for a suit of clothes. In the fall of 1920, when prices of farm commodities were at a low level and when clothes were still high in price, approximately 27 fleeces were needed to purchase the same kind of a suit. By 1922 conditions in the wool and clothing market had become readjusted, so that practically the same number of fleeces were needed to buy a suit of clothes as before the war.

### Wool Import Duties.

During the colonial and early national eras there was no tariff on wool. Prior to 1800 comparatively little attention had been given to sheep raising. Between 1800 and 1815 numerous importations of Spanish Merino sheep were made, and during this same period a number of woolen mills were established, which began to create a demand for more wool. Both the raising and the manufacturing of wool were greatly stimulated by the Embargo Act of 1807, the Nonintercourse Act of 1809, and the War of 1812. Shortly after the close of that war, the British began exporting large quantities of woolens to this country, which seriously depressed the woolen industries. The first tariff legislation on wool was enacted in 1816 when a duty of 15 per cent ad valorem was placed on wool, and 25 per cent on woolen goods.

The act of 1824 placed a duty of 15 per cent ad valorem on wool valued at 10 cents a pound or less; 20 per cent on other wools the first year, 25 per cent the second year, and 30 per cent thereafter. In 1828 a combination of specific and ad valorem rates was tried, the rates being higher than in the previous act. In 1854 wool from Canada was admitted free under the reciprocity treaty. In 1857 it was practically put on the free list through a provision that all wool costing
less than 20 cents at the place of exportation was to come in without duty.

The tariff act of 1861 introduced the principle of compensating duties on woolen goods. This compensation was based on the fact that 4 pounds of wool from some of the heaviest shrinking fleeces of South America were needed to make a pound of cloth. As most of the wool imported under this act was admitted on a duty of 3 cents a pound, the compensating duty on woolen cloth was 12 cents.

In 1867 the “blood classification” was introduced. This classification was based on the “blood” or breeds of sheep as follows: Class 1, wool showing any trace of Merino blood and down clothing wools; Class 2, combing wool from “English” breeds; Class 3, native wools, that is, wools from unimproved sheep. An attempt was also made to describe these classes more accurately by designating Class 1 as clothing wools, Class 2 as combing wools, and Class 3 as carpet wools. The act also provided for the naming of the countries from which the wools originated, making virtually a three-fold classification. As improved machinery had made a change in the usage of some of these wools, the terms clothing, combing, and carpet were dropped in 1890.

Between 1867 and 1894 changes were made from time to time in the rate of duty. In 1894 wool was placed on the free list while the duty on woolen goods was considerably reduced.

A duty was again placed on wool in 1897. In this act, a difference was made between unwashed wool and scoured wool, the duty on washed wool being double and on scoured wool treble that on unwashed wool.

The act of 1913 again placed wool on the free list. During the World War period there was a tremendous demand for nearly all kinds of wool. The close of the war was soon followed by a severe depression and a resulting surplus of wool. In the emergency tariff bill of 1921, duties were again enforced on wools of Classes 1 and 2, while Class 3 or carpet wools were admitted free. The present schedule was enacted in 1922. It provides for a duty on “wool not improved by the admixture of Merino or English blood” (carpet wools) of 12, 18, and 24 cents, depending on whether in the grease, washed, or scoured. Such wools may be imported under bond, and if used for the manufacture of rugs, carpets, or other floor coverings are admitted free. The rate on all other wools (used principally in the manufacturing of woolens and worsteds), whether in the grease or scoured, is 31 cents a pound on the basis of clean content (scoured weight). This act also provides for additional ad valorem duties, or for a change of duties, if deemed expedient by the President. In passing this bill, it was believed that making a specific tax on the clean content of the wool would do away with the inequalities due to difference in shrinkage in fleeces from various parts of the world. Provision for the changing of the rates by executive orders was to make possible adjustments that might become necessary because of changed world conditions.
The Sheep Industry.

Table 2.—Rates of duty on wool imports under the tariff acts 1789-1922.

<table>
<thead>
<tr>
<th>Date of act (and when effective)</th>
<th>Rates of duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1789-1816</td>
<td>Free</td>
</tr>
<tr>
<td>April 27, 1816 (July 1, 1816)</td>
<td>First act. 15 per cent ad valorem.</td>
</tr>
<tr>
<td>May 22, 1824 (July 1, 1824)</td>
<td>Value of 10 cents a pound or less, 15 per cent; other wool, 20 per cent until June 1, 1825; 25 per cent until June 1, 1826; 30 per cent thereafter.</td>
</tr>
<tr>
<td>May 19, 1828 (September 2, 1828)</td>
<td>4 cents a pound plus 40 per cent to June 30, 1829; plus 45 per cent to June 30, 1830; plus 60 per cent thereafter.</td>
</tr>
<tr>
<td>July 14, 1832 (March 4, 1833)</td>
<td>Value of 8 cents a pound or less, free; other wool, 4 cents a pound plus 40 per cent.</td>
</tr>
<tr>
<td>March 2, 1833 (January 1, 1834)</td>
<td>Duties exceeding 20 per cent to be reduced to 20 per cent by yearly reductions to July 1, 1842.</td>
</tr>
<tr>
<td>Sept. 11, 1841 (Oct. 1, 1841)</td>
<td>All rates below 20 per cent to be 20 per cent.</td>
</tr>
<tr>
<td>August 30, 1842 (August 31, 1842)</td>
<td>Value of 7 cents a pound or less, 5 per cent; other wool, 3 cents a pound plus 30 per cent.</td>
</tr>
<tr>
<td>July 20, 1846 (December 2, 1846)</td>
<td>30 per cent.</td>
</tr>
<tr>
<td>March 3, 1857 (July 1, 1857)</td>
<td>Value at 20 cents a pound or less free. All other, 24 per cent.</td>
</tr>
<tr>
<td>March 2, 1861 (April 2, 1861)</td>
<td>Value of 18 cents a pound or less, 5 per cent; value over 18 cents to 24 cents, 3 cents a pound; value over 24 cents, 9 cents a pound.</td>
</tr>
<tr>
<td>June 30, 1864 (July 1, 1864)</td>
<td>Value of 12 cents a pound or less, 3 cents a pound; value over 12 cents to 24 cents, 6 cents a pound; value over 24 cents to 32 cents, 10 cents a pound, plus 10 per cent; value over 32 cents, 12 cents a pound plus 10 per cent. Scoured wool, three times these rates.</td>
</tr>
<tr>
<td>March 2, 1867 (March 3, 1867)</td>
<td>Class 1 (clothing wool), value of 32 cents a pound or less, 10 cents a pound plus 11 per cent; value over 32 cents, 12 cents a pound plus 10 per cent. Class 2 (combing wool), value of 32 cents a pound or less, 10 cents a pound plus 11 per cent; value over 32 cents, 12 cents a pound plus 10 per cent. Class 3 (carpet wools), value of 12 cents a pound or less, 3 cents a pound; value over 12 cents, 6 cents a pound. Washed, Class 1, twice these rates; scoured, all classes, three times these rates.</td>
</tr>
<tr>
<td>June 6, 1872 (August 1, 1872)</td>
<td>All wools, 10 per cent reduction of former rates.</td>
</tr>
<tr>
<td>March 3, 1875 (March 4, 1875)</td>
<td>10 per cent reduction of June 6, 1872, repealed.</td>
</tr>
<tr>
<td>March 3, 1883 (July 1, 1883)</td>
<td>Class 1, value of 30 cents a pound or less, 10 cents a pound; value over 30 cents, 12 cents a pound; value over 30 cents, 12 cents a pound. Class 3, value of 12 cents a pound or less, 24 cents a pound; value over 12 cents, 5 cents a pound. Washed, Class 1, twice these rates; scoured, all classes, three times these rates.</td>
</tr>
<tr>
<td>October 1, 1890 (October 6, 1890)</td>
<td>Class 1, 11 cents a pound. Class 2, 12 cents a pound. Class 3, value of 12 cents a pound or less, 4 cents a pound; value over 12 cents, 7 cents a pound. Washed, Class 1, twice this rate; scoured, Class 1 and 2, three times these rates; fit for carding or spinning, Class 3, three times these rates. Foregoing rates are in the minimum tariff; the maximum tariff is 25 per cent higher and is to be in force to March 31, 1910, and thereafter, unless the President by proclamation declares no discrimination by particular countries.</td>
</tr>
<tr>
<td>August 27, 1894 (August 1, 1894)</td>
<td>Free.</td>
</tr>
<tr>
<td>July 24, 1897 (July 24, 1897)</td>
<td>Class 1, 11 cents a pound. Class 2, 12 cents a pound. Class 3, value of 12 cents a pound or less, 4 cents a pound; value over 12 cents, 7 cents a pound. Washed, Class 1, twice this rate; scoured, Classes 1 and 2, three times these rates; fit for carding or spinning, Class 3, three times these rates.</td>
</tr>
<tr>
<td>August 5, 1900 (August 6, 1900)</td>
<td>Clothing wool, unwashed, 15 cents a pound; washed, 30 cents a pound; scoured, 45 cents a pound.</td>
</tr>
<tr>
<td>October 3, 1913 (December 1, 1913)</td>
<td>Wool not improved by admixture with Merino or English blood, in the grease, 12 cents a pound; washed, 18 cents a pound; scoured, 24 cents a pound.</td>
</tr>
<tr>
<td>May 27, 1921 (May 28, 1921)</td>
<td>If used for carpets, rugs, or other floor coverings, duty refunded. Other wool, in the grease or unwashed, 31 cents a pound of clean content; scoured, 31 cents a pound. (All rates subject to change by President after investigation of cost of production, domestic and foreign.)</td>
</tr>
</tbody>
</table>

Outlook for the Industry.

The history of the sheep industry is made up of periods of abounding prosperity followed by periods of extreme depression (figs. 55 and 61). War has always played a prominent part in creating instability. It develops an abnormal demand for wool to which the sheepman always responds to the limit of his resources. Just as
surely, however, as he has profited temporarily by war, he has suffered by its termination. No instance is recorded in recent centuries in which the signing of peace did not find the sheep industry vastly overexpanded. On such an occasion not only are the number of sheep invariably in excess of peace-time needs, but there is always an accumulation in the world of both raw and manufactured wools.

The majority of the world's sheep have in the past been kept on the outskirts of civilization, where they have met frequently with severe competition from cattle. The continuous occupation of the more arable grazing lands for the growing of farm products needed by an increasing population, as these areas have become available through improved transportation facilities, has resulted in large numbers of cattle and sheep being constantly shifted to areas hitherto unoccupied. In such movements the sheep were generally forced to the less accessible areas.

Until very recently new regions were being made available for livestock production at frequent intervals. As the sheep, which were kept almost wholly for wool, could be run very cheaply, and since during prosperous times money with which to finance the industry could easily be secured, there were periods of rapid expansion to the point of overproduction. Such periods of overproduction were almost invariably followed by corresponding periods of depression and liquidation. Again, as much of the business was of an exploitive character and as provision against adverse climatic conditions was seldom made, there were frequent and heavy losses.

The pioneer phase of the industry is rapidly passing and with it, it is believed, much of its consequent instability. There is relatively little unoccupied land in the world to which the industry can turn. In general any future world expansion will be largely at the expense of cattle or wheat production. As wool is necessary to the welfare of the race, and as the present production is hardly more than sufficient for present needs, there is bound to be a growth in the industry as population increases. It is somewhat problematical, however, whether the growth of the sheep industry will keep pace with that of population.

World Trend.

Practically all of the large producing centers, unless it be parts of South Africa and Asia, seem to have reached their maximum number of sheep. In fact, in most of the leading countries, as in Australia, Argentina, and the United States, there has been a notable decline in the number of sheep in recent years. It would seem, considering the world-wide need of wool, that this decline would soon reach its limits, if it has not already done so.

While practically all the available land is now in use, it is probable that ultimately considerable areas of semidesert lands that are now inaccessible to livestock, because of an insufficient water supply, notably parts of South Africa, will be made available to sheep by the provision of wells and reservoirs.

In the past the sheepmen who produced only wool could not meet competition from other agricultural enterprises unless they were located on very cheap land. The sheepmen of to-day, except in the semiarid regions, are no longer solely dependent on wool. Consider-
The Sheep Industry.

ing the industry as a whole, lamb production is now a highly important and profitable feature, while there is usually a good market for mature mutton.

In the readjustments that are taking place, the sheep industry of the world seems to be settling down to three general types: (1) The production of fine wool with lambs as a secondary consideration in the arid regions; (2) the production of lambs and wool in the semiarid regions; and (3) the production of lambs, with the wool of secondary importance, in the humid and subhumid regions.

In the arid regions where stock water is scarce, where vegetative conditions are less favorable to other stock, especially cattle, and where transportation facilities are limited, sheep of the fine-wool type, which are kept primarily for the production of wool, will continue to be, for several years at least, the leading agricultural enterprise.

In the semiarid regions of the world where grazing meets with competition from the growing of small grains, but where intensive agriculture is not practicable, sheep will probably continue to be one of three, or possibly more, major enterprises. As most of the sheep will be kept on privately owned land, the operating expenses will be higher than in the arid regions. In order to meet these larger operating costs, most of the sheep will be of the crossbred type and will be kept for the production of both lambs and wool, the latter being less important. World-wide efforts are being made to establish breeds of the crossbred type that will have the necessary characteristics for the production of marketable lambs and uniform fleeces, suitable for the manufacture of worsteds.

In the humid regions where general farming prevails, the majority of the sheep will be kept primarily for the production of lambs. In such regions wool is usually secondary and seldom forms more than about one-third of the total receipts. In regions of intensive agriculture, sheep will occur generally in small flocks and as one of a number of farm enterprises. The dairy cow will continue to be their greatest competitor.

Trend in the United States.

The pioneer phase of the sheep industry, in which sheep are extensively kept on new and comparatively cheap land, is passing. A large percentage of the sheep are now grazed either on owned or leased pastures and in national forests for at least a part of the year. The investment in stock and equipment is so great that wasteful methods will lead to failure. Sheep must now be handled with the utmost care and along the lines of the most scientific thought if the venture is to prove profitable.

Although the future holds promise of a much greater stability for the industry than has been true in the past, the sheepman of the United States will always find competition. He must compete not only with woolgrowers in other parts of the world, but also with other meats for a place in the diet, and, finally, with producers of other livestock for land, labor, and all the intricate machinery of production. He must expect also recurring cycles of prosperity and depression. When prices are low producers, particularly on farms, reduce the size of their flocks or go out of business. This temporarily
The number of sheep in the United States kept pace with the increase in number of people until 1884, which year marked the high point of the industry. The number per capita is now only two-fifths as great as in the early eighties. It is interesting to note the wavelike character of the curve of number of sheep since 1884, the crests being 8 to 10 years apart. It is also noteworthy that despite the decrease in number of sheep the production of wool has remained more or less constant till recently, owing to increasing weight of fleece. The per capita consumption of wool has been maintained by a great increase in imports. The peaks of imports in 1897 and 1909 appear to have been occasioned by anticipation of tariff acts, while that of 1915 to 1919 was owing to war demands.
increases the number of sheep marketed, which further depresses the price. Later, the supply of wool is found to be approaching exhaustion and the supply of mutton is so low that prices rise. As this occurs producers, especially on farms, begin to increase their flocks, causing prices to continue to rise until a little later an increase in the supply of wool and mutton causes prices to fall and the same cycle is repeated.

It would seem that the industry reached a low point during the recent period of financial depression and that it is again building up. As during recent years more than half of the wool used in this country, including carpet wool, has been imported and as the demand for mutton is continuing strong, there is need for a considerable expansion of the industry. This expansion as already noted will probably be characterized by less violent fluctuations than in the past, because unused lands are no longer available. Considerable expansion can come with better utilization of western grazing areas and improved management of farm flocks.

**Number of Sheep to Every Eight People.**

![Diagram of sheep numbers per eight people from 1899-1903 to 1919-1923]

**Fig. 62.**—The ratio of number of sheep to human population in the United States has been declining since 1884. In the 5-year period, 1899-1903, there were approximately 5 sheep for every 8 people. Ten years later there were only 4. For the period of 1919-1923 there were only 2.8 sheep for every 8 people, or about one-third of a sheep per person.

The Outlook for Sheep in the East.

The eastern and midwestern farmer, with good markets close at hand, can more easily meet the competition of the western range operator, as their costs are approximately equal. In fact, there are many farms where sheep, kept largely on farm by-products, can be more cheaply produced than under some of the western range conditions. The limiting factors in any rapid increase in the number of eastern farm flocks seems to be the general lack of knowledge concerning the care of sheep, especially the prevention of diseases, competition with established and successful farming systems, inadequate fencing, and the fear of dogs. The rapid growth of small farm flocks in the irrigated sections of the West shows that sheep can be advantageously fitted into general farming systems.

In those localities where the greater part of the land is kept in cultivation, the sheep will seldom occupy more than a secondary place. This is especially true in the corn-producing section, where
hog raising and the fattening of livestock will continue for some time as the main livestock enterprise. In localities near large centers of population dairying will predominate. In regions where, because of the broken character of the land, it is desirable to keep fully half or more of the farm in hay and pasture, sheep are finding an important place. This is especially true of those regions that are somewhat remote from centers of dense population. Under such conditions sheep will generally be associated with either dairy or beef cattle and will probably be one of the major enterprises, not infrequently the leading one. While such sheep will generally be of the mutton type, there are regions, such as the upper Ohio Valley, where sheep for some time to come will be kept primarily for the production of wool.

There is room also for considerable expansion of the industry in the South. However, any growth will probably be slow, as this region is especially adapted to the growing of tilled crops. The lack of adequate pastures and the difficulty of handling parasitic diseases are also severe handicaps at the present time.

The Outlook for the Industry in the West.

In the West expansion will generally be on the basis of much higher operating expenses than formerly. The sheepmen, however, are already meeting these conditions. In the first place a large percentage of the operators are keeping flocks of the crossbred type. In such flocks the lambs furnish approximately 55 per cent of the revenue, as against 45 per cent for wool. They are also giving their sheep better care, and as a result are generally securing better lamb crops as well as heavier fleeces. Better management of the sheep and of the range is also making it possible to carry additional stock on the same extent of range.

One serious handicap in the expansion of the business is that of securing adequate range. Many operators are finding it difficult to secure sufficient range for their present needs. Others who are operating wholly on the public domain are faced with the uncertainty as to how much longer these lands, some of which are deteriorating, will be available to them.

The rapid deterioration of the remaining public domain, because of constant unrestricted grazing, is given much concern. Nearly all livestock producers recognize the need of some stabilized policy of protection, in order that further destruction of these areas may be prevented. Various plans for the better control and utilization of the remaining public domain, not suitable for farming purposes, have been suggested. While many prefer private ownership or long-term leasing, the plan that is being given most consideration is that of creating grazing districts and allotting stock among resident users under a permit system somewhat similar to that now in the national forests. Under proper systems of grazing the carrying capacity of these areas can be increased greatly. An adequate and settled land policy would make it possible to place the Western sheep business on a much more stable basis than has previously existed, and would probably result in a considerable increase in the number of sheep.