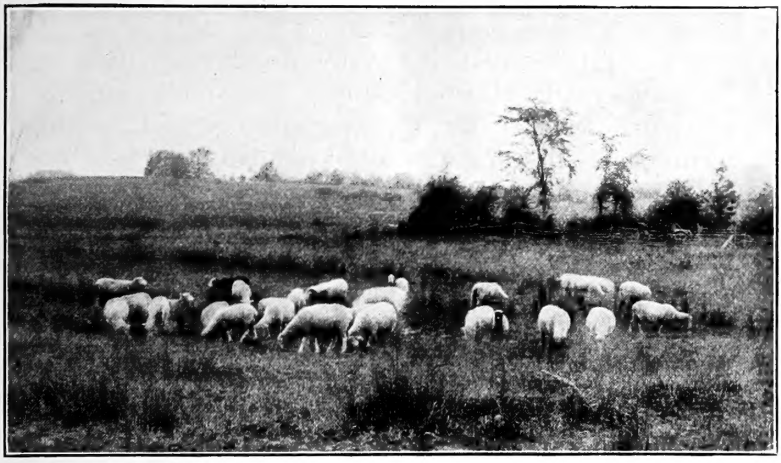
Branch, F. H. - Sheep on New England farms. (1918)

THE PLACE OF SHEEP ON NEW ENGLAND FARMS

F. H. BRANCH
Assistant Agriculturist



FARMERS' BULLETIN 929

UNITED STATES DEPARTMENT OF AGRICULTURE

OFFICE OF THE SECRETARY
Contribution from the Office of Farm Management
W. J. SPILLMAN, Chief

Washington, D. C. Issued March, 1918

CONDITIONS CREATED by the European war have made sheep raising on a small scale a very profitable enterprise for the New England farmer so situated as to take advantage of the economic conditions.

Prior to the recent remarkable advance in prices of wool and mutton, sheep raising in New England was comparatively unprofitable, but now, under certain conditions, a revival of the industry seems desirable.

This bulletin tells briefly how the industry was organized in 1914, and discusses the difficulties to be met in expanding the business, with special reference to improvement in breeding stock, better care, and more efficient disease control.

THE PLACE OF SHEEP ON NEW ENGLAND FARMS.

CONTENTS.

RAPIDLY CHANGING economic conditions, such as the increase in the cost of commercial feeds, scarcity of labor, and the increase in prices of wool and mutton, have induced many farmers in New England, as well as those in other North Atlantic States, to turn their attention with renewed interest to sheep raising. Those already keeping sheep intend to increase the size of their flocks, while others are thinking of putting on sheep, some to the exclusion even of dairy cattle. Present prices of sheep products are attractive and in themselves likely to stimulate interest in sheep raising, and there is no doubt that there are conditions in the eastern part of the country under which an increase in the number of sheep kept is justifiable. However, no material reduction in the number of dairy cows to make place for sheep should be made without a careful consideration of the limitations of the sheep business and the relative returns from each of these live-stock enterprises.

PURPOSE OF BULLETIN.

Farm management studies conducted in New England during the summer of 1915 by the Office of Farm Management have made available figures which show what the returns from sheep and dairy cattle have been on many farms, and which, when considered in the light of present-day prices, give an excellent indication of what may now be expected from each industry.

It is the purpose of this bulletin to show:

1. The relative importance of the industry and the place that sheep now occupy on New England farms.

2. The returns from sheep as compared with dairy cattle.

3. The more important difficulties experienced by sheep growers and the practices followed in handling these troubles.

The conclusions arrived at are based on actual figures obtained from a large number of farms representing the three States in New England in which most sheep are found, and upon the opinions of farmers keeping sheep under present-day conditions. The locations of the areas studied are shown in figure 1.

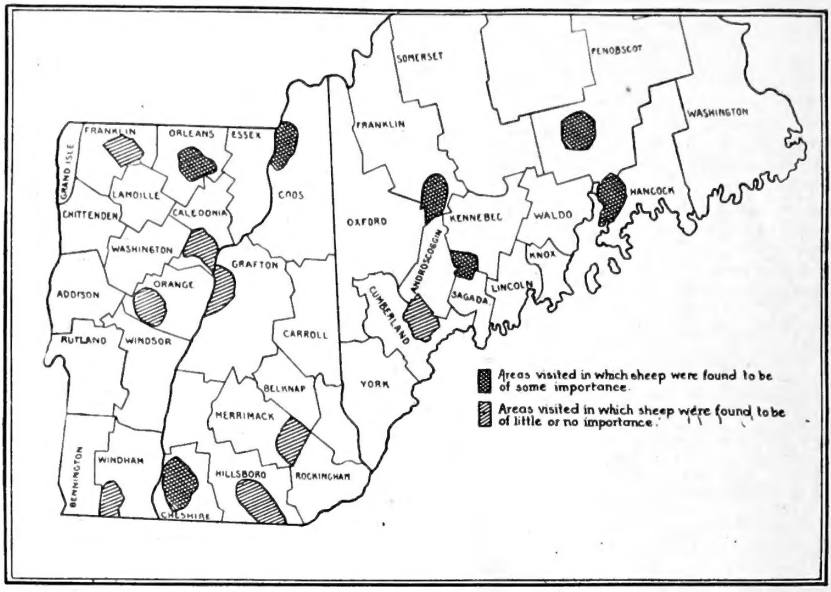


FIG. 1.—Location of areas in New England visited in farm management study of sheep.

AREAS IN WHICH SHEEP WERE OF SOME IMPORTANCE.

State.	County.	Township.	State.	County.	Township.
Maine	Penobscot	Corinth.	New Hampshire	Cheshire	Walpole.
	Hancock	Bucksport.		do	Surrey.
	do	Orland.		do	Gilsum.
	Franklin	Farmington.		do	Westmoreland.
	do	Wilton.		do	Keene.
	do	Jay.		do	Swansey.
	Kennebec	Winthrop.	Vermont	Orleans	Irasburg.
	do	Monmouth.		do	Brownington.
New Hampshire	Coos	Stewartstown.		do	Barton.
	do	Colebrook.		Windham	Wilmington.
	do	Columbia.		do	Whitingham.

AREAS IN WHICH SHEEP WERE OF LITTLE OR NO IMPORTANCE.

Maine	Cumberland	Gray.	New Hampshire	Hillsboro	Milford.
	do	New Gloucester.		do	Hollis.
New Hampshire	Grafton	Bath.	Vermont	Franklin	Franklin.
	do	Haverhill.		do	Berkshire.
	do	Piermont.		do	Sheldon.
	Merrimac	Louden.		do	Enosburg.
	do	Pittsfield.		do	Bakersfield.
	do	Chichester.		Caledonia	Peacham.
	do	Epsom.		do	Barnet.
	do	Pembroke.		do	Ryegate.
	Hillsboro	Lyndesboro.		Orange	Randolph.
	do	Amherst.			

CONCLUSIONS.

Following, in brief, are the more important conclusions drawn from this study:

1. Sheep raising in New England is, at the present time (1917), a relatively small, but, highly profitable business if properly managed.

2. It is believed that the sheep industry could be greatly increased without a material decrease in the number of profitable dairy cows.

3. On most farms adapted to sheep raising, sheep should be kept in small flocks, though much larger than the present average, in conjunction with other kinds of live stock.

4. Sheep, because they require comparatively little grain and labor, are particularly well adapted to many farms located far from market or to such as have abandoned other forms of live-stock farming because of the high cost of these commodities.

5. As conducted at present, there is great need for the improvement of the sheep industry in New England, particularly with reference to more careful selection of breeding stock, better care, and disease control.

6. Good care is a vital factor in its bearing upon the profitableness and development of the New England sheep industry, and its importance can not be overemphasized. Except possibly for disease, it is believed more failures in the sheep business are due to lack of proper care than to anything else.

7. The disease factor is one of paramount importance, which, together with low prices, seems to have had much to do with driving the sheep business from the East, and which is still of much concern to the New England sheep breeder.

8. The dog question is a serious one still, but a marked improvement in public sentiment is evident and there is good prospect of further legislation designed to protect the sheep grower in this regard.

9. The question of breed seems comparatively unimportant so long as the sheep kept are of one of the mutton breeds, careful selection and good care counting for more than the breed.

PRESENT STATUS OF THE SHEEP INDUSTRY IN NEW ENGLAND.

At present less than one-eighth as many sheep are kept in New England as were kept from 65 to 70 years ago. In 1850, according to the Federal Census, there were approximately 2,257,600 sheep (exclusive of lambs) in New England, whereas in 1910 there were only 306,400, the decline having been rather constant during that interval. Since 1910 the decline has continued as previously, and, as estimated by the Department of Agriculture, the number of all sheep in New

England on January 1, 1918, was but 360,000. The ratio of this number to the number on hand in 1850 is as 1 to 6.3.

Figures obtained for this study check very closely with 1910 census data in showing that at present about seven-eighths (86.7 per cent) of all sheep in New England are found in Maine, New Hampshire, and Vermont. Of these three States, Maine has more sheep than New Hampshire and Vermont combined, or nearly one-half of all in New England. In Maine practically 1 farmer in every 5 (18.6 per cent) keeps sheep; in New Hampshire and Vermont 1 in every 10 (10.1 per cent), while in the rest of New England as a whole an average of only 1 farmer in 50 keeps sheep. As will be shown later, sheep in any of these States are confined to certain regions, so that the ratio of farmers with sheep to all farms would be somewhat greater in regions where sheep are found than is indicated by the figures given, which apply to the States as a whole.

On the farms on which sheep are kept these animals constitute about one-fifth of all productive live stock (all live stock except work animals), and at prices prevailing prior to 1916 contributed slightly less than 6 per cent toward total farm receipts. At present prices this percentage would probably be about doubled.

SHEEP KEPT IN REGIONS RELATIVELY UNFAVORABLE FOR DAIRYING.

Reference to the map (p. 4) shows eight districts visited in which sheep were comparatively important and seven other districts in which sheep were of very little or no importance. A study of these regions and of the kind of farming carried on in them shows that for the last few years, at least, sheep in New England have not been kept to any great extent in regions well adapted to dairying and that those regions in which sheep have been most extensively kept are somewhat lacking in the natural advantages of a typical dairy section.

It must not be inferred from this that dairy farming is of no account in regions where sheep are found. Dairying is carried on on many farms in these regions and, as will be seen later, on farms with sheep, but for the regions as a whole it was found that the keeping of beef cattle was much more common and that the business of dairying was of relatively small importance. Fewer cows were kept in these regions; a considerable portion of the cows kept were of beef breeds, and dairy products contributed far less toward the total farm receipts than in areas where sheep were of no importance.[1] In the regions with the sheep one farmer in every five kept beef breeds of cattle, while these breeds are scarcely to be found in the areas

[1] Areas with sheep as a whole had an average of only 9 cows per farm, and receipts from dairy products amounted to but $510, while areas where sheep were of no account had an average of 15 cows per farm and receipts from dairy products amounted to $1,070.

studied with no sheep. The relative unimportance of dairying in regions where sheep raising is more common is in large measure due to rougher pasture not so well suited to the needs of dairy stock, remoteness of farms from market, and generally poor market facilities.

KEPT MOSTLY IN SMALL FLOCKS WITH OTHER LIVE STOCK.

Sheep in New England are kept mostly in small flocks. A few large flocks consisting of 200 or more ewes are known, but such cases are indeed rare. Farm flocks usually number from 15 to 30 ewes, the average number on the 137 farms from which records were obtained being 23. A few farmers kept less than 15 ewes while only about 1 farmer in 5, in the regions studied, kept more than 30 ewes.

Practically all flocks are kept on farms with other live stock. An occasional small farmer who derives the most of his income from the sale of crops or fruit, or from labor off the farm, keeps a small flock of sheep (in addition to a little other stock for family needs) as the only kind of live stock yielding cash income. About one-tenth of the flocks upon which records were obtained were kept in this way; one-half were kept on dairy farms, while the remaining two-fifths were found on farms which kept beef cattle as the principal kind of live stock.

DO NOT DISPLACE OTHER KINDS OF LIVE STOCK.

Kept in these small numbers, sheep do not displace other kinds of live stock, but are kept in addition to the regular quota of other stock on such farms as have extra pasture available. It was found that, regardless of whether sheep were kept in conjunction with dairy or with beef cattle, farms with sheep had practically the same kinds and numbers of other live stock as did farms without sheep.[1] Moreover, farms with the sheep had an average of 15 more acres of pasture than did farms without the sheep,[2] warranting the conclusion that sheep in New England have not been kept to the exclusion of other live stock, but have been kept on farms with large pasture areas to utilize the extra pasture available.

[1] In making this determination it was first found that swine and poultry, which do not usually require pasture as kept in New England, were kept in about the same numbers on farms regardless of sheep. All cattle were then reduced to a mature animal basis (counting 2 head of young cattle as the equivalent of a mature cow) and the average number of pasturable animals (mature animal basis) determined for farms with and for farms without sheep. Following this method, it was found that 68 dairy farms on which sheep were kept had on an average the equivalent of 16.1 mature cattle in addition to 22 sheep, while 298 dairy farms of comparable size, but without the sheep, had the equivalent of 16.3 mature cattle. Likewise 54 farms keeping sheep in conjunction with beef cattle had on an average the equivalent of 15.4 mature cattle in addition to 24 sheep, while 60 beef-cattle farms without the sheep had the equivalent of 15.5 mature cattle.

[2] Farms with sheep had an average of 85 acres of pasture, while those without sheep had 70 acres.

SHEEP FOUND ON LARGE FARMS WITH LOW-PRICED LAND.

Pasture is a prime essential to sheep raising, and it has been shown that only such farms as have pasture above the needs of other stock have kept sheep. As would be expected from the nature of New England land, such a pasture excess is to be found on the larger farms only. In the areas studied sheep are scarcely ever kept on farms of under 100 acres.[1] On farms above this size, flocks gradually became more common, occupying the most prominent place as a farm enterprise on farms of 200 acres or more, where they are kept on about one farm in every three and in comparatively large flocks. The 122 farms keeping sheep with the other stock had an average area of 219 acres, while 358 farms, falling within the same sized limits and similarly organized except for the sheep, had an average area of only 179 acres.

It was found, moreover, as to character of the land area, that these larger farms with sheep have, for the most part, practically the same acreage in crops as farms without sheep, but a relatively higher percentage of pasture and woodland, resulting in a lower land value per acre. Land values on farms on which sheep were found in all three States averaged $25 per acre, whereas the average value on the small farms without sheep was $29 per acre.[2]

HOW THE BUSINESS IS CONDUCTED.

For the year 1914, 30 per cent of the receipts from sheep on the 137 farms studied were derived from the sale of wool; 62 per cent from lambs, and the remaining 8 per cent from the sale of old ewes and increase in inventory value above purchases. At present-day prices with the same production (1917), the receipts from wool would increase to about 40 per cent of the total and those from lambs and ewes decrease proportionately, since the price of wool has increased more rapidly than that of mutton. These figures give an idea of the kind of business carried on. Practically all breeders included in the study were producing spring lambs which were marketed in the late summer or fall at the age of 5 or 6 months, though an occasional breeder was supplying a special trade with fall or early winter lambs marketed in the spring. Practically all sheep were grades, the medium-wool "down" breeds being the most common, though some of the flocks were badly mixed and, as their owners said, they kept "just sheep."

[1] The few flocks previously referred to as being kept by small farmers were kept on farms of this size.

[2] Only from one-fourth to one-third of the land area of New England farms is suitable for cultivation.

REPLACEMENT AND DEPRECIATION.

The transactions and changes affecting the 137 flocks of sheep give an idea of the depreciation, and of the replacement necessary in order to maintain a flock of sheep in a normal year when little disease occurs. Of all the sheep on the 137 farms at the beginning of the year (Apr. 1, 1914) 10.9 per cent were sold as old sheep, 4.4 per cent died, and 0.8 of 1 per cent were slaughtered, making a total of 16.1 per cent, nearly 1 sheep in every 6, which were either disposed of or died during the year. Of the sheep in the flocks at the end of the year (Mar. 31, 1915) 11.3 per cent were yearlings (lambs of the previous year), while 3.4 per cent were purchased, the total replacement being slightly less than the sales and casualties and resulting in a slightly decreased inventory.

These figures, which are believed to be representative for a year in which little disease occurs, show that in order to maintain a flock of sheep without any decrease in number, it is necessary to replace about one-sixth of the flock each year and that, except for the rams, this replacement consists largely of lambs raised on the place. A loss by death of slightly less than one sheep in 20 can be normally expected, while slightly more than one lamb in 20 dies after having made considerable growth, to say nothing of the deaths occurring at and shortly after birth.

PRODUCTION AND PRICES.

As to production in 1914, each sheep sheared an average of 6.5 pounds of wool, and 75 lambs were raised for every 100 sheep kept.[1] Eleven of the 75 lambs raised were retained in the flock to replace old ewes, leaving only 64 lambs to be marketed for every 100 sheep kept. In addition to the receipts from the sale of wool and lambs, an average of 11 old ewes were sold for every 100 sheep kept.

The average price received for wool was 22 cents, and lambs at that time brought from 6 cents to 6½ cents per pound, live weight, averaging $4.63 each for all sold. The average inventory price for mature sheep at the beginning of the year, April 1, 1914, was $5.24, and $5.50 at the end of the year, March 31, 1915. Discarded ewes were sold at an average price of $4.10 each, while $7.04 was the average price paid for sheep purchased, which were mostly bucks.

THE PROFITABLENESS OF SHEEP AS COMPARED WITH DAIRY CATTLE PRIOR TO 1916.[2]

THE ANIMAL UNIT AS A BASIS OF COMPARISON.

In order to compare the relative returns from the various kinds of live stock some standard of comparision has to be adopted, and to

[1] This number probably included about 10 yearling ewes which had no lambs, and in addition to the 75 lambs raised, 4 died after having made considerable growth, so that the lambing rate for the ewes bred was nearer 88 per cent than 75 per cent.

[2] While the study is based on figures pertaining to the 1914 business year, prices of sheep products did not change materially until 1916, so that the figures apply to the year 1915 as well as 1914.

this end use has been made of what is termed an animal unit. An animal unit as here used is a standard unit to which all classes of stock are reduced for means of comparison, and is based upon the amount of feed required by each class of animals when kept under usual farm conditions. It has been found that 1 mature horse or cow, 2 head of young cattle, 7 sheep, or 5 hogs consume in the course of a year approximately the same amounts of feed, hence those numbers[1] for the classes of stock given are taken as constituting one animal unit.

In the discussion to follow an animal unit of sheep may be thought of as 7 ewes (6 of breeding age and 1 yearling) in addition to their lambs raised to the age of 5 or 6 months. An animal unit of dairy stock in a similar way consists in part of young cattle as well as mature animals, and it is the animal unit of dairy stock rather than a single cow that should be kept in mind in the following pages.

RECEIPTS FROM THE TWO ENTERPRISES.

With prices and production as previously given, the average receipts per head of sheep kept (yearlings included) were $4.78.[2] At this rate, assuming 7 head of sheep equivalent to an animal unit, the receipts per animal unit of sheep under prices and production prior to 1916 were $33.46. The receipts[3] per animal unit of dairy stock, on the other hand, were $67.12, not including $8.40, the estimated value of unmarketed skim milk which could have been sold at 40 cents per hundred weight,[4] making a total of $75.52.

---

[1] While the numbers given hold in a general way, adjustment has sometimes to be made to meet the varying breeds and conditions of different regions under which stock is kept. For example, in the case of sheep, where a considerable portion of the lambs' growth is made on feeds other than their mother's milk, requiring extra feeding of either the lambs or ewes, allowance has to be made, in which case, figured on the basis of mature sheep, the number constituting an animal unit would be somewhat less than seven. After having given this point careful consideration it has been decided that as sheep are kept in New England, most lambs being born in the spring of the year and marketed in the fall, seven ewes (yearlings included), raising what lambs they may, is the right number to use as constituting one animal unit.

[2] Includes the following:

Wool, 6.5 pounds at $0.22	$1.43
Lamb, 64 per 100 sheep at $4.63	2.96
Old ewes and inventory increase	.39
Total, per sheep	4.78

[3] The average production of dairy cows in the regions in which sheep were kept and with which the comparison of profits is made was slightly less than 200 pounds of butter fat, or a little less than 5,000 pounds of 4 per cent milk. Cream and butter constituted by far the most important classes of dairy products sold, though some whole milk was marketed on a butter-fat basis. Where cream or butter was sold the skim milk was fed on the place and an estimate of the value of that fed to stock other than the cattle made as contributing to receipts. About 75 per cent of all receipts from the dairy were derived from the sale of milk, butter, or cream, and the remaining 25 per cent from sales of stock. The average price received for butter fat for the year in question was $0.345, and butter sold at a proportionate price.

[4] The average price paid for skim milk in 1914 by creameries in the localities studied, in addition to that paid for butter fat included when buying whole milk.

COSTS.

While the data furnished by the survey study are not complete enough to make possible a detailed study of the cost of conducting either the sheep or the dairy industry, taken with other data obtained for the purpose it is sufficiently complete to give a fair indication of the major expense items which are of most concern to the average farmer and have the most pronounced bearing upon profits. Hence the discussion of costs to follow, which is admitted to be incomplete, is presented only as an intermediate step in determining relative profits of the two industries.

Figures available representing the average value of feed consumed per animal unit by all stock on farms with and without sheep, indicate that an animal unit of sheep and dairy stock in New England each consume in the course of a year practically the same amount of roughage other than pasture, but that the dairy stock require many times more grain than do the sheep. As nearly as can be estimated from the data at hand, the total average feed cost per animal unit of sheep above pasture for the year 1914 was $32.20.[1] The estimated feed cost per animal unit of dairy stock on the other hand was $48.90.[2]

As to pasture, the value of that furnished the sheep in late summer and not furnished the cows has already been included in the feed cost under the head of supplementary forage crops. Further than this no attempt will be made to estimate the value of pasture, as it is believed that this cost per animal unit is practically the same for either sheep or dairy cattle and that for the purpose of comparing returns it can well be omitted.

Labor, as nearly as can be estimated, cost about $6.30 per animal unit of sheep as compared with $18.45 per animal unit of dairy stock. This allows for 4.2 days of man labor per year per animal unit of sheep and 12.3 days for the dairy stock, the rate in either case being $1.50 per day, which, according to survey figures, was the average prevailing day wage paid in those regions in 1914.

The feed and labor costs together total $38.50 per animal unit of sheep, and $67.35 per animal unit of dairy stock.

---

[1] Includes:

Hay, 2 tons, at $11.40	$22.80
Straw and stover, 0.2 ton, at $5	1.00
Roots, 7 bushels, at $0.10	.70
Supplementary forage crops	3.50
Grain feed, 280 pounds, at $1.50 per hundredweight	4.20
	32.20

[2] Includes:

Hay, 2 tons, at $11.40	$22.80
Straw and stover, 0.2 ton, at $5	1.10
Silage, 1.1 tons, at $3.75	4.10
Grain feed, 1,400 pounds, at $1.50 per hundredweight	21.00
	48.90

RELATIVE PROFITS.

Subtracting the combined feed and labor costs ($38.50 per animal unit for the sheep and $67.35 for the dairy cattle) from the respective receipts[1] ($33.46 and $75.52), it is found that the receipts from sheep lacked about $5 ($5.04) per animal unit of paying for the feed and labor cost, while the dairy stock left a margin of slightly more than $8 ($8.17) over these costs. In other words, if home-grown feeds be charged at farm value,[2] with feeds purchased at cost and labor at the prevailing wage, sheep, under price and production conditions prevailing prior to 1916 scarcely more than paid for the feed consumed during the fall, winter, and spring months (to say nothing of labor, summer pasture, and other costs),[3] while dairy stock paid for both feed and labor and left a margin just about equal to the value of unmarketed skim milk, which would go a considerable way in offsetting the pasture and overhead costs. Had the production of lambs been at the rate of 100 per cent rather than 75 per cent, and the clip of wool been 1 pound greater per sheep, the returns from sheep would have compared much more favorably with those from dairy cattle. It was the opinion of the majority of farmers that sheep were paying better during the period to which the data pertains than formerly. This evidence, together with the figures presented, indicating that dairy cattle were relatively more profitable than sheep for the period just prior to 1916, strongly indicates at least one good reason why the sheep industry declined in the East.

THE RELATIVE PROFITABLENESS OF SHEEP AND DAIRY CATTLE AT PRESENT PRICES.

The figures given above showing relative returns from sheep and dairy cattle are based on prices and production prevailing prior to 1916. From a recent interview the same production still holds, but under present prices, quite another story as to relative profitableness of the two industries would be told. For the present season wool has about trebled in price,[4] while the price of lambs has about

[1] These receipts include no estimate of the value of manure produced, but it is believed that this is about the same per animal unit of sheep as per animal unit of dairy stock, and that this would in no way change the conclusions as to relative profits of the two kinds of live stock.

[2] Market value less the cost of marketing. In case of hay, less the cost of baling and hauling to market.

[3] Includes interest, use of buildings, and any minor special costs. Depreciation and use of sire, other expense items usually included in the cost of conducting a live-stock enterprise, are eliminated, as with the method employed they are taken account of in figuring receipts; that is, the sire in each case has been included with the rest of the stock in figuring animal units, and the receipts per animal unit represent returns over losses and decreased value of breeding stock.

[4] While a few farmers in New England have received as high as 70 cents per pound for this season's wool, others who sold early received no more than 55 cents, so that it is believed that the bulk of the 1917 clip was sold for no more than 66 cents per pound, which is three times as great as the 1914 price.

doubled. The price received by farmers for dairy products, on the other hand, has increased by about 40 per cent during the same period.[1]

As to costs, grains most commonly fed in these regions have increased in price by about 75 per cent;[2] roughage has remained at about the same price (due probably to the large hay crops of the last two years in the regions studied); while labor has increased by about 33⅓ per cent[3] of the former cost.

At present prices, then, assuming the same production from sheep on the one hand and from dairy stock on the other, the gross returns per animal unit of sheep would be $76.93 instead of $33.46, and from the dairy stock $101.37 instead of $75.52. The combined feed and labor costs for the sheep, assuming the same amounts but present prices, would increase from $38.50 to $43.75 and for the dairy stock from $67.35 to $88.65. At these prices the net profit over feed (except pasture) and labor cost per animal unit of sheep are approximately $33.18, as compared with $12.72 from dairy stock, showing that at present, sheep are far more profitable, in small flocks at least, than dairy stock. Prices for sheep products, due no doubt to conditions caused by the war, have increased far more in proportion than have those for dairy products; and furthermore, sheep stand decidedly in favor at present because of requiring relatively little grain feed and labor, the costs of which have increased greatly, while roughage, which forms by far the greatest expense in the cost of keeping sheep, has not increased materially in value—in New England at least.

IMPROVEMENT OF THE SHEEP INDUSTRY.

Though sheep raising as now conducted on the farms studied is a profitable business at present prices, the writer, judging from the

[1] For the two periods of nine months each, ending Aug. 31, 1914, and Aug. 31, 1915, respectively, the Turner Center Creamery, at Auburn, Me., paid an average price of $1.78 per hundredweight for whole milk testing 4 per cent butter fat, while for the same period ending Aug. 31, 1917, the average price paid by the same concern for the same grade of milk was $2.49 per hundredweight, or an increase of practically 40 per cent. A large part of the dairy products in the regions studied in Maine were sold to the concern mentioned, and it is believed that this increase in price of milk is representative of the increase in areas studied in New Hampshire and Vermont as well. A nine months' period instead of a full year was used in making the comparison, as only that length of time up to Sept. 1, 1917, had elapsed since the price of milk had increased materially.

[2] These increases are based on figures obtained at the time the survey was made, together with a knowledge of the prices paid during the past spring and summer. The price paid for grain feed in 1914 was about $30 per ton. An increase of 75 per cent over this amount, to $52.50 per ton, is believed to represent not far from the average price paid for what feed was purchased in the regions studied during a nine months' period ending Aug. 31, 1917.

[3] The average value of labor (farmer's time included) in the regions studied for the year 1914 was about $36 per month, including that part (about one-half) of a man's board not produced on the farm. An increase of 33⅓ per cent, or $48 per month, is believed to cover fully the value of labor spent on the two classes of live stock concerned during the past year.

experiences of many growers, is convinced that there is much room and great need for the improvement of the sheep industry in New England and that the average grower could, with better care, make the business a much more profitable one, even under normal conditions and without the artificial stimulus to prices given by the war.

INCREASING THE LAMBING RATE.

One way of increasing profits is by increasing the lambing rate, which, as will be remembered, was only 75 per cent (on basis of all sheep kept and lambs raised) for the year to which the data pertain. This low rate seems due to three or four reasons, all of which could with better care and closer attention be easily obviated.

In the first place, some breeders are careless about breeding and often fail to get the ram with the flock at the proper time, with the result that many ewes go unbred. Others fail to provide sufficient and suitable feed to keep their stock at all times in good condition, which is as essential at and before breeding time as during pregnancy. Some fail to give the close attention necessary at lambing time, while still others are careless about the selection of breeding stock, keeping in their flocks small, immature ewe lambs (in many cases selling their best ones) and old decrepit ewes which might better have been discarded. It is known that loss results from all these sources and that each contributes toward decreasing the number of lambs born, to say nothing of the deaths that occur at and after birth. Also it is believed that much could be accomplished in the way of increasing the lambing rate through selection, retaining for breeding the offspring of the more prolific ewes that are sure breeders, good milkers, and good mothers.

With closer attention to the factors enumerated it is believed that the lambing rate can be increased so that 100 lambs can be raised per 100 sheep kept rather than 75, as was the case in 1914. In order to attain this standard, assuming a sixth of the flock to be yearling ewes, which in most cases would not be bred, and allowing for a normal death rate of 5 per cent after lambs are started, it will be necessary for every ewe of breeding age to raise at least one lamb and about a quarter of the number to raise a pair. Many of the better breeders are already raising considerably more than this number, and the standard seems a reasonable one to strive for. Such an increase in lambing rate (from 75 to 100 per cent) would allow 25 more lambs to be marketed for every 100 sheep kept, which at present prices would mean an increase in receipts of $2.32 per sheep, or $16.24 per animal unit of sheep.

INCREASING THE CLIP.

The average fleece clipped per sheep in 1914 was only 6.5 pounds. It is believed that by closer selection of stock, eliminating, as before

suggested, all small, immature ewe lambs, as well as old ewes, and with better care, that this average could be raised by at least 1 pound, especially where sheep are kept in such small flocks as in New England. Growers agree that sheep well fed and cared for throughout the year shear more wool than do those not well cared for, and it is generally realized that in order to produce a good fleece it is essential to keep a sheep in good condition. They also think that sheep kept in small flocks, probably because of the better care received, produce more wool than when kept in larger flocks, and it is known that some of the growers, even with the mutton breeds, average over 8 pounds of wool per head. An increase of 1 pound of wool per head at present prices means an increase of about 66 cents per sheep, or $4.62 per animal unit of sheep.

EFFECT ON PROFITS.

A one-third increase in lamb production (from 75 to 100 lambs per 100 sheep) and a 15 per cent increase in wool clipped per head (from 6.5 to 7.5 pounds) means, at present prices, an increase in receipts of nearly $3 per sheep, or $20.86 per animal unit. It is not expected that this increased production can be attained without an increase in cost, which, however, would be nowhere near in proportion to the increase in receipts. Allowing for the increased labor and feed believed to be necessary[1] increases the feed and labor cost at present prices from $43.75, the estimated cost with present production, to $50 per animal unit. The estimated receipts being increased from $76.93 to $97.79 as a result of the increased production, leaves a profit over feed and labor cost of $47.79 per animal unit of sheep instead of $33.18, the profit at present production.

In order to do the dairy industry no injustice in making this comparison, an increased production of 20 per cent, or cows producing 6,000 pounds of 4 per cent milk, which is as reasonable an increase as that assumed for the sheep, has been assumed. Allowing for the increased feed necessary[2] with this production increases the cost as estimated at present prices from $88.65 to $99.85 per animal unit. The receipts being increased from $101.37 to $117.60 as a result of increased production leaves a profit over feed and labor cost of $17.75 per animal unit instead of $12.72, the profit at present production.

Increasing the production of the sheep and of the dairy cattle as indicated, while not changing the relative profitableness of the two industries, increases the profits over feed and labor cost in either case

[1] In making up this estimate of feed and labor cost necessary for the increased production, allowance for the following increases per 7 sheep (animal unit) were made: Roots, from 7 to 35 bushels; grain feed, from 280 to 350 pounds; labor, from 4.2 to 5 days.

[2] Allows for a slight increase in the amount of silage and increases the amount of grain from 1,400 pounds to 1,800 pounds.

by about 40 per cent, making these profits from the sheep business, which it must be remembered is a relatively small industry, $47.79 per animal unit as compared with $17.75 per animal unit of dairy stock.

POSSIBILITY FOR EXPANSION.

A considerable expansion of the sheep industry in New England is no doubt justifiable. The above figures and previous ones show that sheep, in small flocks at least, are more profitable than dairy cattle at the present time (1917). It must not be inferred from this that the sheep industry should to any great extent displace the dairy industry, but it is believed that expansion can be made through other channels without decreasing the output of dairy products or disturbing the economics of the region so far as the dairy business is concerned. One's decision to keep sheep must not be based entirely upon the strength of the profit figures shown, as either business is subject to constantly changing prices which at the present time point to a far narrower difference in profits from the two industries than is indicated by the figures given.[1] Also it must be remembered that the figures given are based on records from comparatively small flocks only. Displacing any great number of dairy cows by their full equivalent in sheep means keeping sheep in large numbers, and, as will be shown later, there seems plenty of evidence to support the belief that sheep thus kept in New England are in no wise as profitable as small flocks.

As to channels of expansion, it is known that there are many unprofitable dairy cows in New England and that many of these could probably well be replaced with sheep. However, where poor care on the part of the owner is the main reason for the unprofitableness of the cow, it is likely that sheep would be quite as unprofitable, and before making any replacement the cause of the unprofitableness should in all cases be determined. Some farms are located so far from market as to make their operation as dairy farms impracticable, while other operators have abandoned the dairy business because of the difficulty of securing help. These two classes of farms offer much room for the expansion of the sheep industry and, if rightly managed, there is little doubt that sheep would prove much more profitable than beef cattle, which at present constitute most of the live stock on such farms. Some other farms in addition to the classes mentioned could carry a small flock of sheep in addition to the regular amount of stock, but careful consideration should be given the pasture requirement to make sure that this does not lead to overstocking.

[1] The price of milk in New England was advanced 1 cent a quart, or about 50 cents per hundredweight, for the months of August and September and the first half of October, while a still further advance of 1 cent a quart was made to be effective from Oct. 15 to Dec. 1, 1917.

CARE OF SHEEP IN NEW ENGLAND.

IMPORTANCE OF GOOD CARE.

Judging from the experiences and observations of the growers included in this study, it would appear that care is the most important factor bearing upon the profitableness of the sheep business in New England, and its bearing upon several sources of loss has already been touched upon. Excepting possibly disease, which is to a large extent avoidable, it is believed that more losses in the sheep business are due to lack of good care and feed than to any other one thing. Although sheep may be said to function to some extent as scavengers—and too many make the mistake of feeding on the assumption that sheep can thrive eating weeds and cleaning up fence rows and wastelands—like any other animals they must have good care if good results are to be expected from them.

The requisites of good care for sheep[1] may be briefly enumerated as follows: Plenty of wholesome feed at all times; dry quarters, good ventilation, and an opportunity to exercise while being stabled; and close attention at lambing time. Occasional inspection and regular dipping is also essential to insure freedom from lice, ticks, and skin diseases.

SUMMER FEEDS.

As to feeds, in most cases sheep in New England require during the summer months nothing but good pasture. In the more favored sections of New England, where natural grazing land (see fig. 2)

FIG. 2.—Sheep grazing on a luxuriant bluegrass pasture in Vermont. Such pastures, which are the exception rather than the rule in New England, do not need to be supplemented with forage crops until late in the season, and sometimes carry the breeding stock through the entire pasture season without supplementary pasture.

[1] The care of the farm flock is fully discussed in Farmers' Bulletin 840, which is obtainable upon request from the Department of Agriculture.

FIG. 3.—A flock scene at salting time. The rough, stony pasture, which is more typical of New England than the one shown in figure 2, affords considerable feed, but has to be supplemented by other feed much sooner. The mistake is often made of leaving sheep on such pastures too late in the season, which is good for neither the sheep nor the pasture.

is to be had, but little other pasture is necessary. In less favored sections, where pastures do not hold out throughout the summer (see fig. 3), other feed should be provided. It has been found impractical in most cases to keep sheep in New England unless pasturage can be depended upon during the entire pasture season, or at least until after the field crops are harvested, when the sheep can be allowed for a time the run of the entire farm. Some make a practice of pasturing sheep with other stock, while others prefer to have them alone. Sheep are known to eat a great variety of herbage, and the majority agree that sheep render a valuable service in keeping down weeds that cows will not eat. On the other hand, it is known that sheep crop much closer than do cows, and it is agreed by the majority that for this reason cows do not do as well, unless the pasturage is luxuriant, when pastured with sheep.

It is especially important that plenty of pasture be provided during the late summer and fall when the lambs need to be put in shape for market and the rest of the flock kept in the best of condition for breeding. At this season of the year the regular pastures usually afford but little feed, and that of an inferior quality, so that it is necessary for good results to make provision for other than the regular pasture. A good practice among many growers is to separate the lambs from the ewes about a month before marketing time, pasturing the lambs on second-growth clover, or in many instances

allowing them the run of the entire farm, and keeping the ewes on the old pasture until after the lambs have been turned off, when the ewes also are allowed the run of the farm. This practice works out satisfactorily where extra fencing for the sheep is not necessary and where the old pasture affords sufficient feed to keep the breeding stock in good condition until they can be allowed the run of the place.

A safer practice, which is already being followed by a few of the more successful growers and which is to be highly recommended, is the growing of some forage crop for late summer and early fall pasture. Rape makes an excellent crop for this purpose and is one well adapted to New England conditions. To give best results rape should be sown on good land, loam preferred, which is not subject to drought, since the crop often fails in dry seasons. If raised on weedy land the seed should be sown in drills 30 inches apart at the rate of 1 to 1½ pounds per acre and the plants regularly cultivated, while if on land free from weeds, broadcast seeding at the rate of from 2 to 3 pounds per acre gives satisfactory results. The crop can be grown alone or, if on clean land, with another crop such as oats or rye or following a crop of corn (see fig. 4), in which case the seed is sown broadcast or in drills between the rows of corn at the last cultivation. Where early feed is desired, and the land can

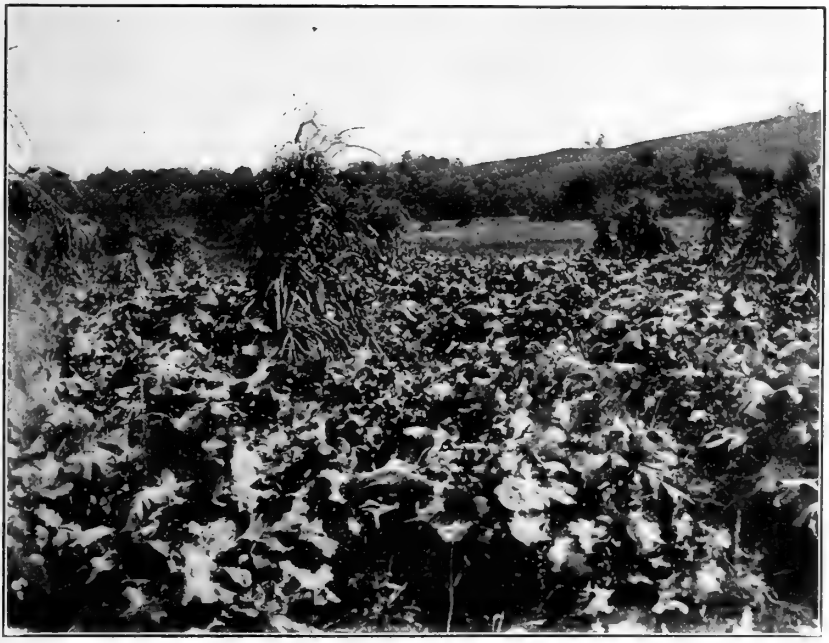


FIG. 4.—Rape grown in corn to be used for fall pasturage in fattening lambs. The seed was sown in the corn at the last cultivation at the rate of 1 pound per acre. Two acres of such feed will normally fatten 40 lambs.

FIG. 5.—Ewes and lambs pasturing on rape, which has been practically all eaten off. This crop, which was sown alone for early fall feeding, was used to supplement the typical New England pasture shown in the background.

be spared, it is probably best to raise the crop alone (see fig. 5), but if the feed is not needed until some little time after corn is normally cut, the latter practice answers the purpose as well. In New England a period of from 8 to 12 weeks should be allowed from the time of sowing the seed until the crop is ready to feed. If sown alone in early May and cultivated, feed should be afforded by the latter part of July, while a seeding in corn from July 1 to 15 ought to provide October and later fall feeding as long as needed, much of the growth being made after the corn is cut. Cultivation induces growth and increases the yield, though the results obtained by seeding corn on good land are very satisfactory.

One acre of the crop grown alone, or 2 acres following corn, is usually sufficient to fatten from 30 to 40 lambs if allowed the run of other fields, as is usually the practice where rape is grown. Care should be taken in regard to bloating, when first turning sheep into a field of rape, but after the first few feeds no trouble need be expected. This crop, if more generally grown would do much toward solving the fall feed question and should be more extensively used where sheep are kept.

WINTER FEEDS.

As to winter feeds, any one of the finer hays makes good forage for sheep. Legumes are to be preferred if not too coarse, coarse hays making poor feeds for sheep. Alsike Clover in particular is to be

recommended, while large Mammoth Clover is too coarse. Some make use of this, however, by allowing the sheep to pick it over and eat only what they want, feeding the coarser parts to other stock. "Rowen," as it is known in New England, or the aftermath from hay lands, is said to make an excellent feed for sheep, and many plan to save their rowen to feed the sheep just prior to and at lambing time. Redtop, fine lowland hay, and what is known locally in many places as June grass, all make good sheep hays, whereas "Herds Grass" (timothy), millet, and other coarse hays are not to be desired.

In addition to dry roughage, some form of succulent feed should be provided. This form of feed is too often lacking; but it is particularly essential in keeping sheep in good condition during the winter, and if fed with the right kind of hays probably reduces considerably the amount of grain required. For New England, probably nothing is better than rutabaga turnips (see fig. 6) for this class of feed. Sweet apples are sometimes fed in the place of or to supplement roots, with good results. Corn silage is available on many farms and could be used as a succulent feed for sheep much more extensively than it is.

Practically the only grain fed to the farm flock in New England is fed just prior to and at lambing time, and most growers agree that some grain at that time is essential. Whole or ground oats and wheat bran, sometimes with a little oil meal, is the grain mixture

FIG. 6.—A crop of rutabaga turnips grown to feed sheep. This form of succulent feed should be more generally used as a part of the regular winter ration for sheep. The topography and vegetation of the pasture in the background is typical of much New England land.

most commonly used. The amount of grain needed seems to depend much upon the other feeds available and to some extent upon the season. If plenty of the finer varieties of hay, particularly clover, has been used, together with succulent feeds in the form of roots or silage, but little grain is needed. On the other hand, if the roughage has consisted largely of coarse, inferior hay, and little or no succulent feed, grain needs to be fed in much larger quantities and for a much longer period. As a general thing it will not pay to keep sheep unless the hays cited as best adapted to their needs can be grown together with some form of succulent feed. Some growers feed no grain at all, but the better ones make a practice of graining for a time, from 4 to 6 weeks in the spring of the year before turning out to pasture, and without doubt it is feed well worth while. The principal thing is to keep the flock in good condition at all seasons of the year, and in order to do this some grain is usually essential for at least a month in the spring of the year, especially if the lambs come before the ewes go on grass.

FRESH AIR AND EXERCISE.

It is known that these two factors of care, which have so direct an effect upon the health of sheep, are too often ignored, and their importance can not be overemphasized. Elaborate and expensive ventilating devices or buildings[1] are not necessary, the main principle to be observed in making provision for ventilation being to make sure that fresh air is to be had at all times without exposing the flock to drafts. The pens should be roomy, at all times dry, and the sheep should be allowed a chance to get out of doors during the day. If necessary to induce exercise, a part of the feed can be scattered out of doors on the snow, but at no time should sheep be exposed to driving snow storms or drenching rains.

ATTENTION IN THE SPRING.

Sheep require relatively little time as compared with other kinds of stock, but attention at certain times is important. At lambing time sheep require close attention, the importance of which is well expressed in Farmers' Bulletin 840, page 14, in the following statement: "The lambing season is the shepherd's harvest time, and the size and quality of the crop practically determine the profits * * *. At this time extra attention must be given to the ewes and lambs. In no other way can time be used to better advantage on the farm." The sort of attention necessary at this season is fully discussed in the

[1] Equipment and building construction for farm sheep raising are fully discussed in Farmers' Bulletin 810, which is obtainable from the Department of Agriculture upon request.

bulletin referred to, while the respective advantages of early and late lambing will be discussed later.

Dipping the sheep, docking and castrating the lambs, etc., are also fully discussed in Farmers' Bulletin 840, pages 14 to 18. Regularity of practice in these regards is an essential factor bearing upon success with sheep.

ADVERSE FACTORS.

DISEASES.

Of the difficulties encountered in sheep raising in New England it is believed that the disease factor is the most important. While but little disease occurred during the year the study was made, taking the sheep-raising sections of New England as a whole, year in and year out, it is known that much loss results through disease. Some growers have but little trouble in this respect, especially those who are careful about selection, feed well, provide sanitary quarters, and keep their flocks in the prime of condition throughout the season, while others report large losses, at times as high as 50 per cent of their entire flocks. (Several such instances were reported during the spring of 1917.)

It is not the purpose of this bulletin to tell how to treat the various diseases to which sheep are subject, but attention is called to those which have most frequently to be contended with, and anyone keeping sheep is advised to acquaint himself with the symptoms and treatment of each. It is believed that much loss can thus be averted.

Stomach worms,[1] grub in the head, nodular disease of the intestines, and indigestion are the troubles most frequently reported in New England and seem to be the ones to which most loss is due. Skin diseases and ticks[2] are also important and give considerable trouble unless regular dipping is practiced.

Much complaint is heard of flocks running out or degenerating, and many breeders say that they have to sell out and start their flocks anew at intervals of every 8 or 10 years. It is believed that a great deal of the running out of flocks is due as much to worm trouble, which is not recognized as such in many cases, as to anything else. A change of pasture at intervals of every 10 days or two weeks is recommended as a safeguard against worm trouble, though this is not always practicable as New England pastures are located. It is likely that much more could be done in combating this disease by making more extensive use of aftermaths and forage crops

[1] Farmers' Bulletin 840, p. 20; also Bureau of Animal Industry circular (Zoological Division) entitled "How to prepare and administer the bluestone or copper sulphate dosage in the treatment for stomach worms."

[2] "Sheep scab" is fully discussed in Farmers' Bulletin 713 and the "Sheep tick" in Farmers' Bulletin 798, either of which is obtainable upon request from the Department of Agriculture.

in supplementing the regular pastures. As prevention of infection is the most practical means of handling this trouble, it is important that the breeder inform himself of the method outlined in Farmers' Bulletin 840 in order to be better enabled to cope with it.

A few growers, who already have regular pastures so located as to permit shifting, recognize the advantages of changing pasture and make a practice of changing their flocks from one pasture to another, and sometimes to a third, during the same season, and though in most cases they can give no good reason for their success, they claim to get better results by so doing. Since the length of time on each pasture is much greater than two weeks (the maximum time a pasture can be occupied and insure safety from infection), it is likely that the advantage gained in this respect is due to the better feed afforded rather than to the prevention of worms, yet the practice is a good one and should be more generally followed.

The appearance of some flocks brought under the writer's observation, and their histories as told by the owners, lead to the conclusion that most of the so-called running out not due to disease can be attributed to poor care and to degeneration as a result of long-continued inbreeding. Inbreeding to any great extent should be avoided and new blood introduced occasionally in order to maintain vigor and vitality.

The disease factor is one which can hardly be overemphasized. It appears to be one of the most important factors, probably much more so at present than the dog question, in the development and profitableness of the sheep industry of New England.

THE DOG QUESTION.

What has many times been set forth as one of the greatest obstacles to sheep raising in New England is the dog. Loss from canine depredation is considerable, and it is sometimes claimed that the dog[1] was responsible for the decline in sheep raising in the eastern portions of the country. From the figures heretofore given, showing the profits under former prices, together with investigation in respect to this particular question, it would appear that other factors, particularly disease, low prices, and the development of cheaper grazing lands in the West, were each quite as potent as the dog in this regard.

It must not be inferred from this that the dog question is to be ignored. It is still a serious one, and one that calls for further remedial legislation, in some States at least. There is, however, a marked improvement in public sentiment and good prospect that sheep growers will get additional protection in this regard.

[1] The question of the sheep-killing dog is fully discussed in Farmers' Bulletin 935, which is obtainable from the Department of Agriculture upon request.

Wild animals, particularly bears, are said to be quite as great a menace as the dog in some of the more remote regions, but such conditions are rare.

SIZE OF FLOCK.

Since in New England, with but few exceptions, sheep are kept in small flocks[1] only, the question naturally arises: Are sheep so kept because large flocks are unprofitable? Practically all the farmers interviewed agreed that sheep do better in small flocks, and while some could give no good reason for their belief, others were of the opinion that the better results obtained from small flocks were due to the better care received by each individual. The same principle as regards the strong and weak applies with sheep as with other animals, and it is a great mistake to put weak, immature sheep or old ewes in with a lot of strong individuals and expect all to do well.

Probably one reason why large flocks have not done better in England lies in the limited housing space available on the average farm. Most farms on which cattle are kept have housing space for a small flock only, and all growers agree that sheep should not be crowded. Not only is the wool clipped per head likely to be less when the sheep are kept in crowded quarters, but also the chance for disease, ticks, and improper nourishment is greatly increased. Sheep need, in addition to wholesome feed, plenty of room, a chance to exercise, and good ventilation, none of which can be had in crowded quarters. Some farmers keeping no more than 40 ewes separated them into two flocks, during both summer and winter, saying that they obtained better results by so doing. It may be that in these cases housing space was so arranged as to accommodate only 20 head in one flock, but in the light of the experience of others, it is believed that as many as 40 sheep, and probably a few more, can be safely handled in one flock, provided all are good strong individuals, housing space is adequate, and feed and pasturage plentiful.

Farmers' Bulletin 840 points out that at least 30 ewes, or, better still, 60 or more, can be much more economically handled than a very small flock, and that because of its being a much more important part of the farm business the large flock is likely to receive more attention and better care than the very small one.

In a few instances large flocks of sheep are being kept in New England with good success, but these cases are the exception rather than the rule, and occur where practically the entire business of the farm is caring for sheep. One of the largest breeders in New Hampshire keeps on an average from 225 to 250 breeding ewes, keeping them both summer and winter in three separate flocks. Where close

[1] In this discussion the term "small flock" includes numbers up to 40 or 50 head.

attention can be given, such as these flocks receive, results from large flocks are satisfactory, but such flocks are not to be recommended for the general farmer, who has not the time to devote to giving them the close attention required.

While it is no doubt possible, under certain conditions, especially at present prices, to make sheep in large flocks pay, it is more than likely that the small flock—consisting of from 20 to 50 head, depending upon housing space and available summer pasture—kept in conjunction with dairy cattle as a general farm proposition, is the most desirable flock for New England. The figures given show that, with but few exceptions, sheep are kept in practically no other way; the experiences of growers lead to the same conclusion, and farmers themselves are of the same opinion.

QUESTIONS OF BREEDS AND BREEDING.

Sheep of the middle-wooled "down" breeds are the most numerous in New England, and of these the Shropshire and Hampshire are probably the most common. Dorsets and Cheviots are important in some regions, and other breeds to a less extent. Traces of Merino blood are also to be found in some flocks, especially among the older flocks, whose owners were in the business when the production of wool was the main reason for keeping sheep. Most of the flocks are "grades," the better breeders keeping pure-bred rams and grading up their flocks to some particular breed, while in a few flocks, whose owners say they keep "just sheep," it is difficult to detect the marks of any particular breed.

As to the comparative merits of the different breeds[1] there is great diversity of opinion. All agree that the "down" breeds are more easily handled in regard to fencing, but it is claimed that some of these breeds are less hardy and do not withstand the rigorous New England climate as well as some other breeds. Any number of instances are known, however, where the breeds condemned for this reason are being kept with good success, so that something other than the breed is evidently at fault with those who claim poor success. The Cheviots, on the other hand, are noted for their hardiness, and some prefer to cross in with the Cheviots in order to secure this hardiness, while the same advantage is claimed for the Merinos by those who still have that blood. Dorset crosses are kept where early lambing qualities are desired.

For a general farm proposition New England needs a dual-purpose sheep that will produce a good heavy lamb in a reasonably short time and grow a good fleece of wool in addition. The middle-wooled

[1] Fully discussed in Farmers' Bulletin 576, to be obtained from the Department of Agriculture upon request.

mutton breeds seem to come the nearest to fulfilling these requirements, and it is known that these breeds do well if careful selection of breeding stock is practiced and good care given at all times. Within this class it is a matter of choosing one's favorite breed, picking out good strong ewes each year and occasionally introducing new blood, preferably of the same breed. Crosses do well in some instances, but the promiscuous mixing of breeds is in nowise to be recommended, and under usual circumstances it is the best practice to stick to the same breed, aiming at all times to keep none but strong, healthy stock.

EARLY VERSUS LATE LAMBS.

As to the best time to have lambs come, whether early or late spring, there is great diversity of opinion, and numerous growers can be found who are following each method, apparently with equally good results. Either method has its advantages and disadvantages, and which practice one should follow depends to a large extent upon market demands and the facilities of individual breeders for handling sheep. Early lambs are said to be less subject to attacks of parasites[1] than are late lambs, which is a very important factor where stomach worms have given trouble. It is claimed by those who have their lambs come early that by getting an earlier start they make larger lambs, which can be turned off earlier than when they come later. It is also pointed out that early lambing permits of dipping, docking, and castrating before the lambs are turned away to pasture, important operations which are likely to go undone if the lambs do not come until the ewes have gone on grass.

Those who have their lambs come late claim, on the other hand, a great saving in expense for grain, the lambs requiring no grain and the ewes but little as compared with that fed to both for a long period under the other method. With this method it is said that scarcely any trouble is experienced with ewes not having milk and disowning their lambs, a trouble which occurs to a considerable extent where lambs are dropped early. Also with late lambs less attention is required at lambing time, and it is claimed that if pastures are good and the season not cold the lambs begin to grow at once and make a much better and quicker growth than where the lambs come earlier.

From the writer's observations, while late-dropped lambs may make a quicker growth, in regions where this method is practiced lambs are not marketed until a month or so later than in other regions, and where the market demands summer and early fall lambs, it is doubtful if late lambs will make a profitable growth.

[1] Farmers' Bulletin 840, p. 22.

BREEDING YOUNG EWES.

While many young ewes are bred to lamb at yearling age, the advisability of the practice as a general one is questionable. Many breeders are of the opinion that the growth of the average ewe lamb is greatly impaired if she is bred to lamb at yearling age, and that, while many young ewes can be bred to lamb at that age, small stock will result if this practice is followed. Others, however, say that if their lambs have been born early in the spring and have made good growth, the ewe can be bred to lamb at one year of age with no evil results. The writer knows of a few breeders who take exceptionally good care of their flocks and raise strong early lambs, and who are following this practice with apparently good success. It is likely, however, that the practice is not to be recommended for the average grower, whose lambs are born none too early in the spring to make the growth essential, and that an increased lambing rate can better be achieved by other means.

SINGLE VERSUS TWIN LAMBS.

In the preceding pages it has been shown that in order to increase the lambing rate to 100 per cent on the farms studied about one-fourth of the breeding ewes must raise twin lambs. Many growers prefer to have their ewes raise but one lamb, saying, in most cases, that "one good lamb is better than two poor ones," but here again it seems a matter of care more than anything else, and the best breeders see no objection to a good strong ewe raising a pair of lambs, nor do they think that twin lambs are likely to be much smaller than those dropped singly. They prefer, in most cases, to have young ewes and old ewes raise but one lamb each, but do not object to strong medium-aged ewes having more than one lamb. The more successful growers aim to get as many lambs as possible, and one of the best ways of increasing the lambing rate seems to be by selecting along this line.

SHEEP ON LARGE RANGES.

The writer's attention has been called to a couple of large ranges; one, embracing upward of 4,000 acres, a large part of which affords fair grazing, being cited as a possibility for a large sheep proposition; the other, which was said to carry 500 or 600 sheep, as a striking example of failure due, as nearly as could be determined, to disease and lack of care. One drawback to the first proposition, and without doubt to others of its sort, was its lack of tillable land, or at least enough of such land on which to grow the necessary forage for wintering the breeding stock. This difficulty could perhaps be obviated by operating the range in conjunction with tillable farm land in the same or other localities, utilizing the range as pasture

during the summer and housing the breeding stock during the winter on the farms growing the forage. Such a proposition should be carefully considered from all angles, however, before making the venture, and especially in reference to suitable feeds and trouble from disease. These two factors are of vital importance with the small flock, but their importance is magnified many fold when it comes to keeping sheep in large numbers. The small farm flock can be handled in connection with other stock with but little trouble, and, if well cared for, under present prices at least, it is a valuable asset to its owner. The large flock, on the other hand, calls for close attention, and requires the services of a shepherd who thoroughly understands his business if success is to be expected.

PUBLICATIONS OF THE U. S. DEPARTMENT OF AGRICULTURE RELATING TO SHEEP RAISING.

PUBLICATIONS AVAILABLE FOR FREE DISTRIBUTION BY THE DEPARTMENT OF AGRICULTURE.

Breeds of Sheep for the Farm. (Farmers' Bulletin No. 576.)

Sheep Scab. (Farmers' Bulletin No. 713.)

The Sheep Tick and Its Eradication by Dipping. (Farmers' Bulletin No. 798.)

Equipment for Farm Sheep Raising. (Farmers' Bulletin No. 810.)

Farm Sheep Raising for Beginners. (Farmers' Bulletin No. 840.)

The Sheep Killing Dog. (Farmers' Bulletin No. 935.)

The Woolgrower and the Wool Trade. (Department Bulletin No. 206.)

The Chemical Composition of Lime-Sulphur Animal Dips. (Department Bulletin No. 451.)

The Use of Energy Values in the Computation of Rations for Farm Animals. (Department Bulletin No. 459.)

Suggestions from Australasia to American Sheep Raisers. (Separate 645 from Year Book 1914.)

Karakul Sheep. (Separate 673 from Year Book 1915.)

PUBLICATIONS FOR SALE BY THE SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C.

Sheep Killing Dog. (Farmers' Bulletin No. 652.) Price, 5 cents.

Management of Sheep on the Farm. (Department Bulletin No. 20.) Price, 10 cents.

Domestic Breeds of American Sheep. (Department Bulletin No. 94.) Price, 25 cents.

Features of the Sheep Industries of the United States, New Zealand, and Australia, Compared. (Department Bulletin No. 313.) Price, 10 cents.

Experiments in Vaccination Against Anthrax. (Department Bulletin No. 340.) Price, 5 cents.

Larkspur Poisoning of Live Stock. (Department Bulletin No. 365.) Price, 25 cents.

Grazing Industry of the Blue-Grass Region. (Department Bulletin No. 397.) Price, 5 cents.

Sheep Scab, Its Nature and Treatment. (Bureau of Animal Industry Bulletin No. 21.) Price, 15 cents.

Prevention of Losses Among Sheep from Stomach Worms, Haemonchus Contortus. (Bureau Animal Industry Circular No. 157.) Price, 5 cents.

Pasturage System for Handling Range Sheep. Investigations during 1909. (Forestry Circular No. 178.) Price, 5 cents.

Special Report on History and Present Conditions of Sheep Industry. (Bureau of Animal Industry.) Price, $1.40.

M