

cows well bedded, card (1) them every day and do not allow a particle of manure left on them. Milk them at regular times, having the same milker milk the same cows each time. Allow no loud talking or other noise during milking time. The cows coming fresh in the fall, and well fed, will give a good flow of milk all winter, and on getting out to grass in the spring, will give nearly as much as though fresh in the month of March.

4th. Handling the Product of the Dairy. Although this part of the subject comes last in this article, it by no means should be thought of the least importance; indeed, upon this depends the financial success of the business. A good deal depends on how you dispose of your product, but in either the retail milk trade, patronizing cheese factories, or home butter-making, offer nothing for sale unless it is of the best. The cows should be carefully brushed before milking, and the hands of the milker kept perfectly dry during the operation. As we use a creamery and make butter, I shall confine myself to that method. Use tin pails for milking, great care being taken to thoroughly scald and clean them. Do not let them stand in the stable after being filled, but strain the milk as soon as you can get enough to fill a can in the creamer. We strain our milk through four thicknesses of cloth aside from the strainer on the pail; this keeps out every hair, if some should get in the milk. The milk being quickly strained will have a temperature of 98°, and should be set in a temperature of 42° in order to get the best results. After setting twelve hours, the cream will be all up, (2) when it should be skimmed. Keep the cream pail in a cool place, and stir up every time you add fresh cream. When you have enough to churn, or at least every three days, place your cream pail in a room with a temperature of about 65° to 70°, and stir occasionally, that it may ripen its contents evenly. As soon as the cream assumes a thickened, velvety appearance, it is ready to churn, and should be churned in summer at 58° to 60°, and in winter at 65° to 68°. We use the barrel churns, and believe they are as good as any. Do not fill your churn too full, one-third full is about right. Turn the churn about forty-five revolutions a minute, not forgetting to air the cream once or twice when first commencing. If everything is all right, in about twenty or thirty minutes the glass will become clear. Then churn slowly until the granules of butter are distinct, and about the size of wheat kernels. Add cool water at about 55°, so the granules will harden slightly and then draw off the butter milk. Wash until the water runs from the churn perfectly clear. Salt in the churn with the best salt to be obtained, and to suit the taste of your market. After standing a short time, work slightly and pack. Use the package which your trade demands, in fact, please your customers. Use parchment paper for covering, and if packing in tubs, line them with the same. If the above directions are followed, you will never have any trouble with unruly churning, and will have an article which will always sell, and at a good price. Stamp your name and address on each package.

For the last four years we have sold all of our butter to one grocer, who supplies private customers who are willing to pay a fancy price for that

(1) We say: brush, but never use a curry-comb.—Ed.

(2) Is this so?—Ed.

which suits them. I like that better than retailing. We guarantee every pound, and have never had a poor churning, or any fault found with the butter.

I presume most of the readers of this will say, "All this trouble will not pay," but all the successful ones will know that it is the very reason why so few reach the top. This is not theory but facts, as I commenced with 125 pound cows, and market prices for butter, and have reached an income of \$70 per cow.—*The Practical Farmer*.

O. H. LIVINGSTONE.

EXPERIMENTS IN FEEDING AT THE DAIRY INSTITUTE, WORLESTON.

The following is taken from the *Macclesfield Courier*:

An almost universal opinion exists among dairy farmers that "rich foods produce rich milk." Of late, however, strange theories have been propounded by some scientific men that the richness of the food has no influence on the quality of the milk, although it does affect the quantity to a considerable extent. A number of experiments have been carried out, chiefly by American scientific men, in support of this theory, and a few are to be found in this country who are imbued with the same idea. The theory is certainly antagonistic to the belief and practice of most dairy farmers. Doubtless, Cheshire farmers feed with the object of increasing both the quantity and quality of their milk. If the American doctrine be true, it becomes a serious question whether high feeding is of the special value that has been ascribed to it.

With a view of trying to throw some light upon this matter, the Farm Management Committee of the Cheshire County Council instructed Mr. Drace to carry out a series of experiments in feeding at the Dairy Institute, Worleston. The main object aimed at was to see if special feeding produced any alteration in the percentage of fat contained in the milk, or, in other words, if the quality or richness of the milk was altered. Three ordinary cows were selected. No. 1, a Welsh cow, had recently calved; No. 2, a cross-bred Shorthorn, had calved three months; and No. 3, a cross-bred Shorthorn, five months. Thus, cows in various stages of their milking career were taken for experimenting upon.

The ordinary daily ration given to the cows at Worleston during the past winter has been a mixture of 17 lb. of good hay with 3 lb. of nice oat straw. In addition each cow received 2 lb. of oats, 2 lb. of maize meal, and 2 lb. bran. During the third and fourth weeks of January the milk of each cow was carefully tested, morning and evening, by means of the Babcock tester for the percentage of butter-fat. The whole milk was then churned, and the amount of butter ascertained. The milk under this system of feeding may be considered as the normal standard of these cows both in quality and quantity, as it was the result of the regular system of feeding in vogue. This may be tabulated thus:

1st Period.	Cow No. 1.		Cow No. 2.		Cow No. 3.		Total milk of three cows in six days.	Total weight of butter.		Average No. of lb. of milk per lb. of butter.
	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.		lb. oz.	lb.	
	34	3.28	20½	3.92	20½	3.47	448½	15 8		28.9

The ration of concentrated food was then completely changed, the hay and straw remaining the same, and 4 lb. each daily of cotton cake, a food rich in albuminoids, substituted. A fortnight was allowed to elapse, so as to get the new ration thoroughly into the system. Then the milk was tested, exactly as in the first instance, and the result registered. We now have:—

2nd Period.	Cow No. 1.		Cow No. 2.		Cow No. 3.		Total milk of three cows in six days.	Total weight of butter.		Average No. of lb. of milk per lb. of butter.
	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.		lb. oz.	lb.	
	35½	3.61	22½	4.13	22½	3.53	479½	23 3		28.3

In the month of March a food rich in carbo-hydrates, viz.—6 lb. daily of maize meal was substituted for the cotton cake, the hay and straw remaining precisely as on the former occasions. After allowing a fortnight again to elapse, the same tests were applied as before, with the following results:—

3rd Period.	Cow No. 1.		Cow No. 2.		Cow No. 3.		Total milk of three cows in six days.	Total weight of butter.		Average No. of lb. of milk per lb. of butter.
	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.	Weight of milk daily.	Per cent. of fat.		lb. oz.	lb.	
	31½	3.19	18½	3.80	21½	3.24	424½	14 5		29.6

Now, it will be noticed that an alteration took place on each set of occasions, both in quantity and quality, and that the same change took place in every cow, and to a similarly proportionate extent. Further, the change is very clearly marked, and also carried out in the average weight of milk required to make a pound of butter.

It will also be observed that the best results are obtained, both in quantity and quality, when the cotton cake, a food rich in albuminoids, was used, and the least satisfactory results when maize meal, a food rich in carbo-hydrates, but containing a less quantity of albuminoids, was given.

This is in accordance with the principles laid down by scientific men as governing economic feeding.

The Farm management Committee do not intend to rest satisfied with these experiments, but will continue them later on with other varieties of feeding.

Now dealing with the question of cost of the various rations used. As the hay and straw remained precisely the same throughout, we will first leave them out of the reckoning, and deal only with the concentrated foods. We then have:—

	Weight of Milk in six days	Butter yielded.	Cost of Concentrated food used	Cost of concentrated food for each lb. of Butter.
1st Period	lb. 448½	lb. oz. 15 8	s. d. 5 1	d. 3
2nd "	479½	16 11	4 2	3
3rd "	424½	14 5	4 6	3½

Thus it appears the cost of the concentrated food required to produce each pound of butter was least when the cotton cake, or highly albuminoid, ration was used.

Next dealing with the whole cost of the food used, and calculating hay at £4 10s. and straw at £3 10s. per ton, we have:—

	Weight of Milk.	Butter.	Total Cost of food used.	Cost of Butter per lb.
1st Period	lb. 448½	lb. oz. 15 8	s. d. 19 10	d. 15½
2nd "	479½	16 11	18 11	13½
3rd "	424½	14 5	19 3	16 1 10