

CARE AND DEVELOPMENT OF THE DAIRY COW.

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Raising the Dairy Calf.

To make a good dairy cow, start with the calf. Choose the calf from the best cow, and raise it with the purpose in view that it is to be a better cow than its mother. The young cow that is not better than its mother has not been raised right. Naturally, all calves of a herd are treated about the same, the dairy calf gets the same care as the beef calf, or on the other hand, the beef calf is treated just like the dairy calf. This is a mistake. In raising a beef calf, meat is the object, and the quicker that a pound of meat can be put on, the cheaper it will be. In raising the dairy calf, she must be kept in a good growing condition. There must not be an accumulation of fat; for muscle, bone, and a good constitution, coupled with strong digestion are what is wanted in the dairy cow.

The difference in treatment should be more marked at the age of 12 to 18 months than before, as flesh is more rapidly accumulated at that time, and is more likely to injure her as a dairy heifer. As has been shown at the Iowa Experiment Station, and elsewhere, the heifer shows a little greater tendency to easy fattening and early maturity than the steer under the same conditions, therefore, the treatment of the two must be different. Excessive development of the flesh-forming function almost always takes place at the expense of the milk production.

A liberal amount of bulky feed should be given to the heifer, to stimulate the growth of a roomy digestive tract. The good dairy cow must be able to digest a large amount of food, that she may produce accordingly. She must have plenty of lung capacity, in order to purify the large amount of blood that is necessary in the digestion of her food and in the secretion of milk. She may be considered as a machine into which we can safely feed our corn and alfalfa, and have

them converted into milk and butter.

When the First Calf Should Come.

There is a considerable diversity of opinion as to the best age for a heifer to drop her first calf. As a rule, the dairy heifer can be bred somewhat earlier than the beef heifer, but she should not be bred too young, as it will interfere with her best development. The opinion of most dairy stock breeders is that they should drop their first calves at two years of age. Professor Curtiss of the Iowa Experiment Station says, "There is some advantage in having the dairy heifer calve early, as it tends to develop the milking function more satisfactorily than when bred at a later age, although good care and liberal feeding are always necessary to prevent normal growth and development."

Too early breeding may weaken the constitution, and thus make the animal susceptible to disease, especially tuberculosis.

Treatment Before Calving.

If possible, dry the cow up six weeks before calving. She needs a rest before starting upon another year's work. Those cows of a beefy type will naturally be dry for a longer period; while some of the best dairy cows will be very hard to dry up. Some of the very best milchers never dry up, and the result usually is, there is a serious lowering of the milk yield the following year.

To dry up the cow, gradually reduce the amount of grain, seldom the hay, and as soon as there is a drop in milk yield, begin milking her less frequently, once a day at first, and soon, once in two days and so on until she is dry.

The cow or heifer that is about to calve, should in all cases unless on grass, be fed some laxative grain or roots, at least two

weeks before calving. A good grain mixture is two-thirds bran and one-third oil meal, fed at the rate of from two to four pounds per day. It is well to continue feeding with this same mixture for two weeks after calving. This feed is soothing to the alimentary tract, slightly laxative, and full of nutriment. It is necessary that the bowels be loose, and special care should be exercised to feed for that effect. Do not feed corn in any case, as it will have a tendency to make the system rigid and tense instead of relaxed. In case of constipation, give the cow one and one-half pounds of Epsom salts, dissolved in warm water and given as a drench.

Treatment at Calving.

Give the cow a warm, comfortable, well bedded stall, especially in the winter. In severe weather, it is best to blanket her. The bran and oil meal mixture that was fed before calving should be continued for a short time after calving, this will, in most cases, keep her bowels loose. In some cases it is well to give a warm bran mash, and sometimes, where the udder is not in good condition, it is well to give a physic of Epsom salts. Cold water should not be given her until the afterbirth has been removed, but she should have all the warm water she wants. If the afterbirth is not removed at the end of thirty-six hours, the cow should receive assistance, as its retention may have the effect of lowering the milk yield for the entire year.

In most cases, it is best to leave the calf with its mother the first three days. The calf needs the first milk, and the frequent rubbing that it gives the udder is beneficial.

In case the udder is inflamed and caked, frequent milking is necessary, the oftener, the better. But she should not be milked clean as it will cause the flow of milk to increase too rapidly and

may lead to milk fever. At the time of milking, rub the udder with camphor and sweet oil or vaseline.

In severer cases it may be necessary to apply hot water flannels to the udder, continually changing them and keeping them on for a day at a time. Sometimes, to keep a constant high temperature, it may be necessary to put a bandage around the udder and pack between with bran, this can be kept hot by throwing the warm water against it. By such treatment, the best cow of the herd may be saved.

Forcing While Fresh.

This is a point to be carefully considered. The cow that is neglected when fresh, and is allowed to loose in her milk yield can never be brought back to her normal yield, no matter how well she is cared for. Many cows are fresh in the Spring when there is a rush of work, and, with some of our dairymen, there is a tendency to let the cow take care of herself until there is less work. This is a great mistake. A low milk yield to start with means a low yield all of the year, and usually, a shortning of the period of lactation; which if the cow had been brought to her highest yield in the beginning and kept there three months, although the cost of a pound of nilk might be higher, she would more than pay for the extra feed during the remainder of the year, besides being developed into a better cow for the coming year.

Milk a Long Time With the First Calf.

Begin the habit of long milk with the heifer and persist in it, and she will keep it up afterwards. She may not give very much milk, and it may not pay, at the time, to milk her, but by the third or fourth calving she will have the habit formed and it will not take

much effort to keep her producing almost all the year. In milking trials made at various places, it has been found that the yield of milk and fat, increases up to and including the fifth or sixth calving, after which it gradually decreases, although there are exceptions in the case of individual cows. The milk is richest in fat after the third or fourth calving.

Character of the Feed. Protein Essential.

The cow not only requires food for maintainance, but must also have the proper food from which to produce milk. If the protein, carbohydrates, or fats, are insufficient in the food given her, she will supply the deficiency, for a time, by drawing on her own body. As a rule, the cow gets too much carbohydrates in the form of hay and fodder, and quite frequently in the grain. Although she may appear to be full, still she is starving for protein, and as long as it is not supplied she will not yield the milk and butter that she should. She cannot make milk casein out of carbohydrates any more than a farmer can make butter out of skim-milk.

Protein is absolutely indispensible, as it goes to furnish materials for the formation of lean meat, blood, tendons, nerves, horns, hair, and of the casein and albumen of the milk. No substance free from nitrogen can be converted into protein or substituted for it. It is therefore necessary that the cow should receive a certain amount of protein in order to live or produce milk.

Investigation has proved that the average 1000 pound cow needs 2.5 pounds of digestible protein, 12.5 pounds of digestible carbohydrates, and 0.4 pounds of digestible fat.

The average feeding stuffs of Kansas are deficient in protein, but the digestible carbohydrates and fats are more than animals can

use. Where alfalfa or soy beans can be grown, there is no excuse for a lack of digestible protein in the ration. The following table shows the digestible nutrients for every 100 pounds of some of the common feed stuffs of Kansas:-

Feed	Protein	Carbo- hydrates	Fats	Nutritive Ratio 1:
Concentrates				
Soy Bean Meal	29.6	22.3	14.4	1.8
Corn	7.8	66.7	4.3	9.7
Kafir corn	7.8	57.1	2.7	8.1
Wheat Bran	12.3	37.1	2.6	3.5
Shorts	12.2	50.	3.8	4.8
Dry Roughness				
Alfalfa Hay	10.6	37.3	1.4	3.8
Corn Fodder	2.	33.2	.6	17:3
Cow Pea hay	10.8	38.6	1.1	3.8
Millet hay	4.5	51.7	1.4	14.4
Oat straw	1.6	41.6	.7	27.0
Prairie hay	3.8	41.8	1.4	12.8
Red Clover hay	6.8	35.4	1.7	5.8
Soy Bean hay	10.8	38.7	1.5	3.9
Timothy hay	2.9	43.7	1.4	16.2

It will be seen that soy bean meal contains more protein than any other of the concentrates. When fed with corn or Kafir, and some roughness, it makes an excellent ration.

Alfalfa hay, cow pea hay, and soy bean hay, all stand high in the amount of digestible protein that they contain. Any of these three feeds with corn or Kafir will make a ration that will contain about the

right amount of protein for the milch cow.

As the supply of carbohydrates and fats are always in excess of the needs in the average feed stuffs, it follows that they lose all commercial value, leaving digestible protein as the measure of value of all feeds for milk production. Therefore, in buying feeds, it is well to get prices of all feeds rich in protein, and find its cheapest source. There is usually a variation as to its cheapness in different feeds from year to year, and it will thus be found to be cheaper in one feed one year, and perhaps in another one the following year. The following table taken from Bulletin 81 of the Kansas Experiment Station gives the relative values of the feeds when protein alone is considered.

Grains. Value for Protein.	Value when corn is worth		
	15 cents	20 cents	25 cents
Oats, per bushel.	\$0.10	\$0.14	\$0.17
Kafir, " "	.15	.20	.25
Soy Beans, " "	.61	.85	1.02
Wheat Bran, per Ton.	8.45	11.26	14.08
Wheat Middlings, " "	8.79	11.72	14.65
Linseed Meal, (O. P.) per Ton	19.78	26.39	32.96
Cotton Seed Meal, " "	25.40	33.88	42.35

Roughness.	Value per ton when Prairie hay is worth per ton.		
	\$2.00	\$3.00	\$4.00
Value for protein.			
Alfalfa hay	6.05	9.08	12.11
Red Clover hay	3.88	5.82	7.77
Orchard Grass hay	2.74	4.11	5.48
Millet hay	2.57	3.85	5.14
Timothy "	1.65	2.48	3.31
Sorghum "	1.37	2.05	2.74
Corn Fodder	1.14	1.71	2.28
Oat Straw	.91	1.37	1.82
Wheat "	.45	.68	.91
Sugar Beets	.62	.94	1.25

Increase the Feed Year by Year with the Result That Each Hundred Pounds of Feed Produces More Milk.

"Heavy feeding burns the cow out." This is true, when we consider heavy feeding to mean, feeding rations that contain an excess of carbohydrates and fats, and not enough protein. To feed a cow all the corn and prairie hay that she could eat would be considered as heavy feeding, and it would burn her out in a short time. The cow may give good results for a short time on this kind of feed. But to get good results that will last, she must be fed foods containing the required amount of protein and not too heavy in carbohydrates. With such feeding, she will continue to develop until she is at least eight years old, and then she will be profitable for some time yet. Great care should be exercised in changing from a ration deficient in protein to one that contains the required amount, it must be done gradually, as a sudden change is often harmful.

Feed the cow right this year, and next year's yield will show it. To feed her an unbalanced ration this year will not help next year's yield, but a well fed balanced ration this year will give better returns for the same amount and same kind of food next year. The good cow will continue to develop for some time, but the poor cow will soon reach her limit. She can then be fattened and sold.

Care of the Cow.

Under this topic we would consider kindness, shelter, and water.

Kindness,- The golden rule of cow culture is, "Do unto your cow as you would have her do unto you." If you would have her kick you, set the example by kicking her first.

Kindness is cheap. The man that is not quiet, even-tempered, gentle, and regular in his habits is not fit for a milker. Investigation has proved that the greater part of the milk is secreted during the time of milking. And as the nervous system is directly connected with the secreting system, the least excitement is likely to influence the flow of milk, it will not only lower the quantity of milk, but will reduce the percentage of butter fat.

Make the cow as comfortable as possible; give her comfortable shelter, dry bedding, plenty of fresh air, and sunlight. Everything that adds to her comfort, adds to her milk yield. Regularity of feeding is essential. Feed her at the same time every day, and not at one hour one day and some other hour some other day.

Provide shade in the summer, either trees or open air sheds.

Shelter,- The cow needs better shelter than any other of our domesticated animals. She requires a warm, dry, well ventilated and light stable. The air space should be one cubic foot of air for every pound of live weight of the animal, and there should be at least

four square feet of glass to every animal. The ventilation must be such as will not cause a draught.

The dairy barn should not contain the grain or hay, as the disease germs that may come from the cows are likely to float through the air and get into the feed. This is one of the means of keeping the barn in a very unhealthy condition and causing the spread of dangerous diseases. The feed barn should thus be either at one end of the cow barn or not in connection with it at all.

Water,- As the greater part of a cow's milk is water (87%) she should certainly have all that she wants. To limit the supply, means to reduce the milk yield. Where it is necessary to water the cows from a pond, it is best to fence it and draw off the water into a trough by means of a pipe which is regulated by means of a float valve. This will insure pure, fresh, water at all times.

In the severest weather of winter, the cows should not be driven out to water. It should either be supplied to them in the stable, or else in some sheltered place in the yard. At this time it will usually pay to warm the water, this can be done by means of a cheap heater placed in the water.

Individual Differences.

It is a fact that one-third of the cows kept in the United States for their milk, do not pay for their keeping, and nearly a third more are not profitable. As a matter of fact, every successful dairyman must study the individuality of his cows, keep a sufficient record of quantity and quality of milk, know approximately the cost of production and systematically weed out the herd. He can set a standard for a satisfactory cow, and maintain it by promptly selling all animals that

do not come up to the requirement, unless there is evidence of better results in the near future.

The herd cannot be fed as a herd, but as individuals. To feed all the cows in a herd the same the year around, as is often done, is a wasteful practice. Some will get more than they can use to advantage, while others will not get enough for greatest profit. The better a cow is fed up to her capacity to assimilate, the greater will be the profit.

Out of 28 cows at the Kansas Experiment Station, there were 5 that brought an average income of \$28.89 above the cost of feed. There were another 5 that brought an average of \$6.35 above the cost of feed, or a difference of 455 per cent. And there were another 4 that were debt contractors to the amount of \$2.35 each. The profit on the best cow was \$40.37, while with the poorest cow there was a loss of \$6.35. The difference in the cost of feed of these two cows was \$5.17 in favor of the best cows.

At the Connecticut Agricultural College, in 1898, the cow with the best record produced during the year 509 pounds of butter at a profit of \$42.82, while during the same time the cow with the poorest record produced 172 pounds of butter, at a loss of \$4.09. The best 5 cows produced butter at an average of 409 pounds per cow for the year, at an average profit of \$31.29; while the 5 least profitable averaged 218 pounds of butter each at an average profit of 87 cents. Such variations are common to nearly all herds, especially to those that are not tested. Twenty selected cows which have been tested are worth more than thirty selected in the ordinary way of making up a herd.