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RAISING DAIRY CALVES.

IMPORTANCE OF RAISING ONE'S OWN HEIFERS

The dairyman who desires to maintain a high quality of dairy cows in his herd, should raise his own calves. Through the use of good pure bred sires he can start with common cows and in a few years have a high producing herd. Or if he has pure bred cows, he can maintain or improve their standard by using good bulls, more cheaply than by buying females from the outside.

Good dairy cows are seldom offered for sale except at high prices. It is seldom that one gets a bargain in cows because if she is a good one the owner knows it and keeps her. Then there is always the danger of bringing diseases into the herd through purchase of cows. Tuberculosis and contagious abortion is prevalent in all parts of the country. It is sometimes difficult to determine the presence of these diseases, and if a diseased cow is brought into the herd she may infect all of the others.

One takes more pride in cattle of his own raising, and (other things being equal) the dairyman will give more affection and care to the animals which have been raised on his own farm. If he is using high class bulls, it is a pleasure to the farmer to note the improvement in each generation. Every calf should make a better cow than her mother, if the owner has been fortunate in the selection of the sire.

Improvement of the herd should be brought about by discarding all unprofitable cows and replacing them by home-raised heifers which have been sired by the best bull obtainable.

COST OF RAISING CALVES.

The cost of raising calves in Arizona will vary greatly with the various sections of the state. In communities such as Tucson, Nogales, and Douglas where there is a high priced market for nearly all of the milk produced, the raising of calves is expensive. But in sections such as the Salt River Valley, the Gila Valley and the Yuma Valley

where more milk is produced and the prices are lower, the cost of raising calves is proportionately less. Since the conditions vary so greatly in the state, we can get at the matter of cost of raising calves better by determining the amount of food needed, and from that the cost can be estimated for any particular community.

Table No. I shows the approximate amount of feed that would be fed dairy heifers in Arizona.

TABLE I.—AMOUNT AND COST OF FOOD UP TO TWO YEARS OF AGE.

First year	Amount consumed	Price of food	Cost of food
Whole milk	130 lbs.	\$ 20 per gal	\$ 3.02
Skim milk	2650 "	.40 per cwt	10.60
Concentrates	273 "	.02 per lb.	5.46
Alfalfa hay	428 "	14.00 per ton	3.00
Silage or sorlage	176 "	4.50 per ton	.40
Pasture	246 days	1.00 per mo.	8.00
Total, first year			\$30.48
Second year			
Alfalfa hay	1200 lbs.	\$14.00 per ton	\$ 8.40
Silage or sorlage	1030 "	4.50 per ton	2.43
Pasture	300 days	2.00 per mo.	2.00
Total, second year			\$30.83
Total food cost to two years of age			\$61.31

These figures are flexible and would be increased in some cases and lessened in others. While the cost may appear high, it should be remembered that in some cases a part of the feed fed to calves may be unmarketable and should not be charged at retail market prices. No attempt can be made to fix a definite cost that would apply in all parts of the state owing to the variation in the cost of feeds.

#### RAISING ON SKIM MILK.

Calves can be fed more cheaply and leading dairymen and experiment stations have demonstrated that as good cows can be raised if skim milk replaces the whole milk after the calf is two to three weeks old. Some dairymen say that their calves are bothered with scours when fed on skimmilk, but this is usually due to carelessness on the part of the feeder. The skimmilk calf may look thinner and rougher at one year of age than the one fed on whole milk, but at maturity there will be little difference between the two.

Table II shows the average composition of whole milk and skimmilk.

TABLE II.—COMPOSITION OF WHOLE MILK AND SKIMMILK.

	Whole milk	Skimmilk
Water	87.10%	90.50%
Fat	3.90	.10
Casein and albumin	3.40	3.57
Sugar	4.75	4.95
Ash	.75	.76

This table reveals the fact that there is little difference between whole milk and skimmilk except in fat content. The fat is the least valuable constituent of milk so far as the calf is concerned. It furnishes only heat and energy, and lays fat on the body. It can be replaced in the ration by feeding grain.

The casein, albumin and ash are very important constituents of milk as they are used by the calf to make muscle, bone, nerve, hair, hide, and hoofs. While butter fat can be sold to creameries at \$600 to \$800 per ton, it can be substituted in the calf's food by grain costing ordinarily about \$30 to \$40 per ton.

The Kansas Experiment Station conducted an experiment with thirty calves to demonstrate the value of skimmilk as compared with whole milk as a food for calves. They were divided into three lots of ten each. One lot was fed skimmilk, one whole milk and the third lot was allowed to run with the mothers. Table III shows the results of the experiment.

TABLE III.—RESULTS OF CALF FEEDING EXPERIMENT.

Lot	No of calves	Days fed	Aver gain per head, lbs	Daily gain per head, lbs	Cost per 100 lbs gain
Skimmilk	10	154	223	1.51	\$2.26
Whole milk	10	154	287	1.86	7.60
Running with dams	10	154	248	1.77	4.41

O. E. Reed has the following to say in regard to the experiment. "The calves nursed by their dams and those fed whole milk made slightly better gains than those fed on skimmilk, but it was at greater expense. The skimmilk calves consumed 122 pounds of grain per hundred pounds of gain, while the whole milk calves consumed 58 pounds of grain and 31.8 pounds of butter fat in the milk. At this rate a hundred pounds of grain is equivalent to 48 pounds of fat."

RAISING THE CALF.

*When to remove calf from its mother:* There is a difference of opinion as to when a calf should be taken away from its mother and be fed from a bucket. Many dairymen prefer not to allow it to nurse its mother at all. It is easier to teach a calf to drink if it has never been allowed to nurse and the mother will not miss it and worry over its separation if it is taken from her as soon as born. If the calf is vigorous and the cow's udder is not seriously inflamed, this is undoubtedly the best plan.

If the mother's udder is caked or if the calf is not as vigorous as it should be at birth it will be better to allow it to remain with the mother one or two days. It is never advisable to leave a calf with its mother longer than three or four days except in the case of a badly caked udder or an unusually weak calf. The older a calf is when weaned, the harder it will be to teach it to drink and the more the mother will mourn its loss. Many cows drop down in their daily milk production several pounds if their calves are removed from them after they are several days old.

*Care of the calf:* As soon as a calf is born, its navel cord should be disinfected with a solution of creolin or painted with tincture of iodine. This precaution will help in preventing white scours,

*Feeding the calf:* It is essential that the calf should get the first milk from its mother. This is called colostrum milk and it is needed! to stimulate the digestive organs of the young calf to action. If convenient, the calf should be fed three times a day for the first week. Feeding small amounts at frequent periods prevents overtaxing the digestive system. The amount of milk to feed will depend somewhat on the size of the calf. During the first two weeks, it should have four to six quarts daily. The amount can be gradually increased until 16 to 20 pounds of skimmilk is consumed daily.

*Do not overfeed:* The amount of milk for each calf should be measured or weighed to avoid over feeding. One cannot guess at the amount closely enough and overfeeding or feeding irregular amounts is sure to produce scours,

*Changing from whole milk to skimmilk:* Table No. IV is intended as a practical guide to follow more or less closely in feeding calves. The amount to use is indicated in pounds but in case the dairyman is not equipped with scales in the milk room he can substitute pints for pounds.

TABLE IV.—FEEDING YOUNG CALVES.

Age	Amount of whole milk per day.	Amount of skim-milk per day.	Amount of grain per day.
1 Day	8 pounds		
2 "	8 "		
3 "	9 "		
4 "	10 "		
5 "	10 "		
6 "	11 "		
7 "	11 "		
8 "	10 "		
9 "	10 "	2 pounds	
10 "	8 "	2 "	
11 "	8 "	4 "	
12 "	6 "	6 "	2 tablespoons
13 "	6 "	6 "	2 "
14 *	4 "	10 "	4 "
15 "	4 "	10 "	4 "
16 "	2 "	12 "	6 "
17 "	2 "	14 "	6 "
18 "	2 "	14 "	
19 "	0 "	16 "	$\frac{3}{4}$ pound
20 "	0 "	16 "	$\frac{3}{4}$ "
21 "	0 "	16 "	$\frac{3}{4}$ "
4th week	0 "	16 "	$\frac{3}{4}$ "
5 "	0 "	16 "	$\frac{1}{2}$ "
6 "	0 *	16 "	$\frac{1}{2}$ "
7 "	0 "	16 to 18 lbs.	$\frac{1}{2}$ "
8 "	0 "	16 to 18 "	1 "
9 "	0 "	16 to 18 "	1 "
10 "	0 "	16 to 20 "	1 $\frac{1}{2}$ "
11 "	0 "	16 to 20 "	1 $\frac{1}{2}$ "
12 "	0 "	16 to 20 "	2 "
13 "	0 "	16 to 20 "	2 "

The change from whole milk to skimmilk should be gradual. Sudden changes of any sort affect a calf seriously.

*Grains cheaper than butterfat for calves:* As the amount of whole milk is decreased the amount of skimmilk and grain should be increased. The grain should be ground, especially while the calf is young. To give the calf a taste for the grain, it can be placed in the milk at first or placed in the bottom of the pail just as it finishes drinking. After the calf learns to eat the grain, it should be fed dry. A tablespoonful twice a day is sufficient to start on but this amount should be increased rapidly until the calf is eating about one-half pound of grain at one month of age, one pound at two months old and two pounds at three months. Grain feeding to skimmilk calves is very important and should not be neglected.

*Feed warm fresh milk:* Milk should be fed warm to calves. Feeding it just after separating is the best plan. It should be of about the same temperature (blood heat) and the same degree of sweetness from day to day. Changes in temperature or sweetness may cause digestive disturbances. The foam on separator milk should be discarded. Calves will thrive on a good quality of sour milk if fed regularly. The difficulty with feeding sour milk is that it may become too old and putrid before it is fed. Keep water before calves at all times.

*Keep pails and pens clean:* Cleanliness of calf pails or troughs and of pens is most essential. Calves should be fed from individual pails which are washed regularly, the same as the milk pails. Filthy feed pails and dirty pens are frequent causes of scours.

*Use stanchions:* Stanchions should be used in feeding calves. They save time for the feeder and prevent milk from being wasted. The calves should be held in the stanchions for some time after drinking their milk. By feeding them grain during this time they are not so likely to suck one another's ears or udders when released. Great harm is often done to heifers by their mates sucking them. They are sometimes brought to milk flow through this means before being bred and occasionally one or more quarters are ruined as a result.

*Points to keep in mind:*

- 1—Do not overfeed.
- 2—Feed warm fresh milk.
- 3—Feed each calf in an individual pail.
- 4—Feed regularly.
- 5—Keep pails and pens clean.
- 6—Replace the fat removed from skimmilk with ground grain.
- 7—Do not feed the foam from separator milk.
- 8—Use stanchions and feed dry ground grain before turning loose

to prevent sucking of ears.

*Fall or spring calves:* It is generally conceded that it is best to feed calves dropped in the ML. Fresh cows usually give a good flow of milk during the winter while on dry feed, and by turning them on to pasture in the spring the mammary glands are stimulated to protected secretion. It is better for the calf to be born in the ML when the tics and heat do not tokf\*. About the time the fall calf is weaned

from milk, the spring pasture is ready and it is not stunted by being fed entirely on dry feed.

Dairy men who contract to supply a given amount of milk or cream throughout the year necessarily have their calves dropped at all seasons in order to maintain a uniform production. As a rule, however, the demand for milk and other dairy products is much greater in the winter and the prices are correspondingly higher. During the summer months there is more heat, more flies and more fidd work, all of which make it desirable to have many of the cows dry at this time.

*Feeding yearling heifers'* Dairy heifers should be fed so as to keep them in a vigorous thrifty condition. It is not necessary that they be fat; in fact, excessive fatness of dairy heifers may prove injurious, if prolonged. When fed on heavy rations they tend to be coarser and larger than those kept thin in flesh, but this coarseness soon disappears after calving. If a dairy heifer is stunted she will probably always be undersized. The heavy tax imposed by milk production prevents any considerable amount of growth during a milking period.

Good pasture in summer and plenty of alfalfa hay and corn silage in winter are good Arizona rations for dairy heifers.

*Age to breed:* The age at which a heifer should be bred depends largely upon its breed and its growth. On the average a Jersey heifer should drop her first calf at 24 to 27 months of age; a Holstein at 30 to 33 months; an Ayrshire at 30 to 33 months, and a Guernsey at about 27 months. A heifer should be well matured before her first milking period begins. Ordinarily if a heifer is bred too young she will always be small and extremely refined, and her milk production will be comparatively low. A larger milk production and a better sized cow is secured if the heifer is well matured at her first calving. It is argued by some that early calving stimulates a milking tendency and creates the habit of using "food eaten for milk production instead of for fattening the body. However, experiments and practice have not shown this theory to be correct.

#### CALF DISEASES.

*Calf scours:* This is the most common disease of calves and it is probable that more calves die from this disease than from any other cause. The digestive system of the young calf is very delicate and easily disturbed and any derangement of the digestive system usually results in scours. There are many causes of scours some of which are overfeeding, feeding cold milk, feeding old or sour milk, feeding irregularly, dirty pails and feed troughs, filthy pens, and sudden changes in quantity or kind of food.

*Treatment for calf scours:* As soon as a calf is affected with scours it should be removed from the others and the pen disinfected with a coal tar dip. The cause of the scours should be determined if possible and remedied.

To stop the scouring, cut down the amount of milk fed one-half, and give 2 to 4 tablespoonfuls of castor oil. Mix a tablespoonful of formalin with one pint of water and add one teaspoonful of this mixture to

each pint of milk fed. Also stir into the milk one teaspoonful of blood meal or feed the calf one or two raw eggs daily. A good way to feed the eggs is to break the end of the shell, have an attendant "hold the calf's head up and open its mouth and let the contents of the egg slip down its throat.

Another popular remedy for scours is a mixture of 1 oz. of bismuth subnitrate,  $\frac{1}{2}$  oz. of salol, and 3 oz. of baking soda. Give one teaspoonful of the mixture three or four times a day until recovered.

A remedy which has met with much success is an injection of warm salt water. Dissolve a heaping teaspoonful of salt in two quarts of warm water which has been boiled and inject into the rectum.

*White scours:* White scours is an infectious dysentery which appears shortly after the birth of the calf. It usually affects several or all calves in a herd and results fatally in three or four days. This form of scours can be determined by the offensive odor and light color of the droppings and by the severity of its action.

There is no known cure for this disease. It may be prevented by strict sanitary precautions such as disinfecting yards and corrals, painting the navel cord at birth with tincture of iodine or full strength creolin and tying it tightly with a disinfected cord.

Because of the infectious nature of this disease the State veterinarian should be notified of its presence. He could be of assistance in controlling its spread. There is a serum which is advertised to prevent and even cure cases of white scours but it is not known whether this treatment is entirely reliable.

*Pneumonia* Pneumonia is prevalent among young stock in Arizona. This disease seems to be brought on by the great variation of day and night temperatures. The symptoms of this disease are high temperature, loss of appetite, constipation followed by diarrhoea, quick breathing, discharge from the nostrils and slight cough. Postmortem examination shows consolidated portions in the lungs.

When this disease is suspected a competent veterinarian should be consulted if one is available. The disease may be prevented by protecting the calves from exposure to sudden changes in temperature and from damp quarters. The treatment for pneumonia consists in keeping the animal dry and warm, feeding\* often on small amounts of milk or raw eggs, and by applying mustard plasters over the chest. Careful nursing and attention are most important. Where constipation is present the calf should be given two ounces of castor oil.

Serums are often used by veterinarians in preventing and combating this disease with apparent success.

*Lice:* Lice are very troublesome to calves in Arizona. The blue lice are most prevalent. This species of lice sucks the blood from the animal and where present in large numbers causes it to become thin in flesh. The treatment for lice is to wash thoroughly or dip in a coal tar, arsenical, or tobacco clip. If possible the dipping should be repeated in ten days to kill lice which have hatched in the meantime.

*Blackleg:* Blackleg very frequently attacks dairy calves and is ex-

tremely infectious. The symptoms of the disease are reddish colored urine, high fever and the presence of a gassy fluid under the skin on some part of the body. This gassy condition may be located by rubbing the part with the hand when a crackling sound may be heard. The flesh at this point is discolored and dark. Cases have been reported where the typical lesions under the skin did not appear. It is presumed that sometimes in young calves only internal lesions form.

The prevention for blackleg is vaccination with blackleg vaccine. This will be furnished free by the U. S. Department of Agriculture Bureau of Animal Industry, or by the State veterinarian. When vaccinating, the directions which accompany the vaccine should be followed closely.

This vaccine produces only temporary immunity and should be repeated in about six months. It will not prevent the disease in an animal which has been infected with the germs of the disease. If the disease is prevalent in the community, it would be well to vaccinate all calves at two months of age and again at eight months.

*Pinkeye:* Pinkeye (infectious catarrhal conjunctivitis or contagious ophthalmia) is prevalent in Arizona. The symptoms of this disease are a discharge of tears and pus from the eyes, inflammation of the mucous membranes and a milky color of the cornea. It often causes temporary and sometimes permanent loss of eyesight.

For pinkeye, use an eyewash of one dram of boracic acid to four ounces of boiling water. This should be used twice a day or oftener if convenient. Separate the affected animals and tie a dark cloth over the eyes to keep out the light and flies. If a dark stable is available the animals should be placed in it.

Applying 2 or 3 drops of a 20 per cent solution of argyrol to the eyes twice a day will give relief in a few days.

*Dehorning calves:* It is desirable to have all cows in a commercial herd dehorned. It causes less pain and takes less time to stop the growth of horns on young calves than to saw or clip horns from older cattle.

The method of dehorning calves is as follows: When the calf is less than one week old, clip off the hair over the button of the undeveloped horn and scrape the skin until blood shows. Rub vaseline or lard into the hair around the horn to prevent burning of the surrounding skin, then rub the scraped place with one end of a stick of caustic potash. This will sear the part and no horn will develop. One should be careful in handling the caustic potash stick as it will burn the flesh that it touches. It can be wrapped in piece of paper when in use.

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