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Raising Calves on Skim Milk

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In many localities a great deal of money is lost each year by feeding calves on whole milk, or by letting them suck the cows. This is often due to the fact that those who practice such methods do not believe good calves can be raised on skim milk. They rather picture the skim-milk calf as being a small, unhealthy, stunted individual that is absolutely worthless. Many such cases can be found. However, such results should not be charged up to the skim milk, but rather to the ignorance oe carelessness of the feeder. It has been shown that as good calves can be raised on skim milk as with whole milk. Several years ago the Kansas Experiment Station carried on experiments to demonstrate the value of skim milk as compared with whole milk as a food for calves. Thirty calves were divided into three groups. One lot was fed on skim milk, another on whole milk, and still another lot was nursed by their mothers. The following table shows the results of these experiments:

Experiment.	No. of calves.	Days fed.	Aver. gain per head. pounds	Daily gain per head. pounds	Cost per 100 lbs. gain.
Skim milk	10	154	223	1.51	$2.26
Whole milk	10	154	287	1.86	7.50
Running with dam.....	10	154	248	1.77	4.41

The calves nursed by their dams and those fed whole milk made slightly better gains than those fed on skim milk, but it was at much greater expense. The skim-milk 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 in feeding value to 48 pounds of fat. After the calf-feeding experiment had closed, the calves, which were steers, were put in the feed lot and fed for a period of seven months. The results of this experiment are very interesting. The calves in the skim-milk lot

made the best gains, those that were fed on whole milk ranked second, while the lot raised by the dams stood last.

Skim-milk calves will not look quite so thrifty for the first few months as calves fed on whole milk or allowed to run with their mothers, but at the end of the year there will not be much difference in size; if any difference, the skim-milk calves will be better, provided they have been properly fed. The skim-milk calf becomes accustomed to eating grain and hay early in life, consequently when it is weaned the change of feed is not so noticeable as it is with the whole-milk calf, and it does not suffer a setback at this time. The calf that has been fed on whole milk has not been accustomed to getting very much of its nutrients from grain and hay, and invariably does not gain as rapidly as does the skim-milk calf for the first two or three weeks after it is weaned.

The study of the following table will reveal the fact that there is very little difference between the composition of whole and skim milk:

	Whole milk.	Skim milk.
Water	87.10%	90.50%
Fat	3.90	.10
Casein and albumin	3.40	3.57
Sugar	4.76	4.96
Ash	.75	.78

The skim milk differs from whole milk in that most of the fat has been removed. The other constituents are proportionately increased. The fat in milk is the least important constituent as far as calf raising is concerned. On the other hand, the fat is the most important constituent in relation to the manufacture of dairy products. The fat is used by the animal body to supply heat and energy and store fat on the body. Other feeding stuff, such as corn or similar grain, can be fed to take the place of fat.

The casein, albumin and ash are the most important constituents of milk for the growing calf. These substances are used by the body for making muscle, nerve, bone, hair, hide and hoofs. These elements are left in skim milk. Then by separating the whole milk, selling the high-priced butter fat, and substituting a cheap grain ration instead, calves can be raised more cheaply.

TAKING THE CALF FROM ITS MOTHER.

The exact time of taking the calf from its mother will depend upon the condition of the calf and its mother at the time of calving. If the calf is strong and in good condition it

may be taken away immediately, without allowing it to nurse. It will be an easier task to teach the calf to drink from the pail if it is taken away from the mother at this time. If the calf is weak at birth, or if the cow's udder is inflamed or caked, it is a better practice to allow it to remain with its mother for several days. In case the calf is taken from its mother immediately it should by all means receive her first milk. The milk at this time contains a high percentage of protein and ash, which act as a laxative and tonic and are

PLATE 1.—Group of Holstein calves raised on skim milk at the Fort Hays Experiment Station.

very effective in cleaning out the digestive tract and stimulating the digestive organs. In some cases it is not safe to feed calves the milk from their mothers after the first few days. The milk from cows belonging to the high-testing breeds is very often too rich in fat for the young calf, and should be diluted with skim milk, or milk from some other cow should be fed.

QUANTITY OF MILK TO FEED.

The quantity of milk to feed the calf at this time is very important. Under natural conditions the calf gets its milk often and in small quantities, and the more closely Nature is

imitated the greater the success. The calf of average size should receive about eight pounds of whole milk a day at first. Large calves should have more than this amount. The milk may be fed in two feeds, night and morning, or better results may be obtained by feeding it three times a day. As the calf grows older the amount should be gradually increased. The best guide as to the amount which should be fed is the calf's appetite. It should be fed sufficiently, but never overfed, and it is a good practice to always keep the calf a little hungry. It should take the last milk from the pail with the same relish that it took the first. It must be remembered that the calf has a small stomach, and there is great danger of overfeeding it. As a general guide for the beginner the following method may be used to determine the quantity of milk to feed.

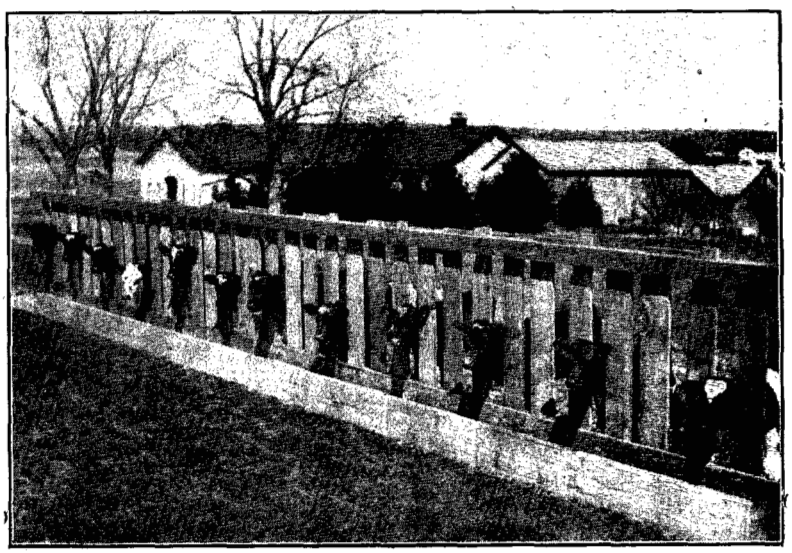

PLATE 2.—The above picture shows the construction of home-made stanchions for calves. Such stanchions are very serviceable in feeding calves by hand.

For the first 100 pounds live weight feed 10 pounds of milk per day.

For the second 100 pounds add 5 pounds of milk per day.

For the third 100 pounds add 2½ pounds of milk per day.

CHANGING TO SKIM MILK.

The time to change the calf from whole milk to skim milk will depend largely upon the development of the calf. If the calf is strong and well developed, it may be changed to skim

milk at the end of the second week. This change should be made gradually by substituting a small quantity of skim milk for whole milk in the daily ration. About a week or ten days should be taken for this change. In this way the calf will go off the whole milk gradually and will not have a distaste for the skim milk.

TEMPERATURE OF MILK.

Care should always be taken to have the milk warm and sweet; especially is this necessary when feeding the young calf. As the calf grows older it will do just as well on cooler milk if it is fed at the same temperature every day. The right temperature for the milk fed the young calf is blood heat, 100° F. The milk should be as nearly this temperature as it is possible to get it. There is no way by which the digestive system of the young calf can be upset more easily than by feeding cold milk at one meal and warm milk at another. If there is any doubt about the temperature, or if the milk has to be warmed at all, the thermometer should be used. Judging the temperature of milk by putting the finger into it is not satisfactory. Milk at 90º F. will feel warmer on a cold morning than it will on a warm morning, and the calf's digestive system is very sensitive to any change. It is also important to feed the milk sweet. One feed of sour milk may upset the digestive system of the young calf for months, and one feed of such milk often causes the death of the calf. It is better to let the calf miss one or even two feeds than to feed it on sour milk.

CLEAN PAILS NECESSARY.

The pails from which the milk is fed should be kept as clean as possible. They should be kept as clean as the milk utensils. If any milk is left in them it will sour, and the calf will soon show the effect. The pails should be thoroughly cleansed and sterilized often.

LENGTH OF TIME TO FEED SKIM MILK.

The length of time that the calf should be fed on skim milk will depend upon the amount of skim milk available for this purpose. Some feeders wean their calves at months of age, but it is a better practice to feed skim milk until the calves are six months old. If one has an abundance of skim milk it is a profitable practice to feed heifers until they are eight months or a year old. This will insure a better growth and better development.

FEEDING GRAIN AND HAY.

At the time the calf is changed from whole milk to skim milk it will begin to eat grain. The best way to get the calf started eating grain is by placing a little grain in its mouth after it has consumed its milk. It will like the taste of grain, and will soon eat without assistance if the grain is placed within its reach. A great many feeders practice the feeding of grain with the milk. This is a serious mistake, especially if the grain consists of corn or other starchy feed. Such feed as corn must be acted upon by the saliva of the mouth in order to insure its proper digestion. When the grain is fed with the milk the calf simply gulps it down and does not masticate it in the least.

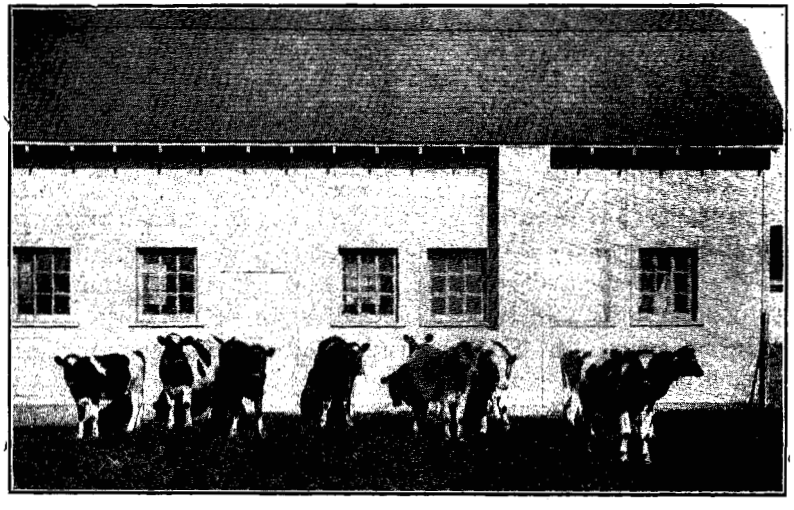

PLATE 3.—Group of dairy calves raised on skim milk at the Kansas State Agricultural College.

In such cases indigestion often follows. When the calf once begins to eat grain readily, only such an amount should be given it as will be cleaned up at each meal. Here again the appetite of the calf is the best guide as to the amount of grain to feed. Usually the calf will not eat over a half pound of grain per day for the first two months. From this time until it is six months old a pound of grain per day will be sufficient.

It has been shown that skim milk is deficient in fat, and in supplementing it one must make good this deficiency. Grains which contain a high percentage of carbohydrates may be substituted for the butter fat. Corn or kafir contain a high

per cent of this substance, and on account of their low cost in the corn belt they are the logical grains to feed with the skim milk. Many farmers and dairymen make the mistake of feeding linseed-oil meal with skim milk, as the only grain ration fed. This mistake is made on account of the idea that some have regarding the composition of oil meal. Many assume that oil meal contains a high per cent of oil, which will replace the fat that has been taken out of the milk. Linseed-oil meal is valuable for feeding on account of the high content of protein. It does not contain a very high per cent of oil. Oil meal may be fed in connection with corn, but this is not entirely necessary, and it is very expensive. The corn has invariably given the best results as a supplement to skim milk. When teaching the calf to eat grain it is better to use corn chop. When the calf gets a little older shelled corn or kafir may be fed.

Hay should be kept before the calf after it is two weeks old, At this age the calf will begin to nibble at the hay, and will soon consume quite a little of it. The eating of hay should be encouraged by keeping nice, clean, bright hay within the reach of the calf at all times. For young calves, mixed or prairie hay is better than alfalfa or clover. The latter are usually too laxative and have a tendency to produce scours. After the calf is two or three months old it will do much better on alfalfa, and will eat a great deal more of it than of the mixed hays. If alfalfa can not be had at this time, good clover or cowpea hay should be fed. If the calf is on pasture it will not be necessary to feed any hay.

THE CALF NEEDS WATER.

Clean, fresh water should be provided for the calf at all times. Many feeders assume that the calf does not need water on account of drinking milk. It will consume a large amount of water even after drinking fifteen or twenty pounds of skim milk per day.

After the calf is weaned from milk the grain ration should be somewhat changed. The object in forming a grain ration for any growing animal is to feed it bone- and muscle-forming feeds. The grain ration at this time will depend upon the kind of roughage fed. If alfalfa hay is used the calves will do well on a ration of corn alone, or mixed corn and oats,

or corn and bran. If mixed or prairie hay, cane or corn fodder is fed, the grain ration should be changed somewhat. More nitrogenous foods, such as bran, linseed-oil meal and cotton-seed-oil meal should make up the grain ration. If the calves are stunted by lack of proper food at this time they will usually develop into undersized cows.

RAISING CALVES WITHOUT SKIM MILK.

On many farms, especially those near the larger milk markets, the whole milk is sold from the farm. On such farms the problem of feeding calves is a more serious one. Here the calf must be raised on the minimum quantity of milk, and this is usually whole milk. Some farmers solve the problem of

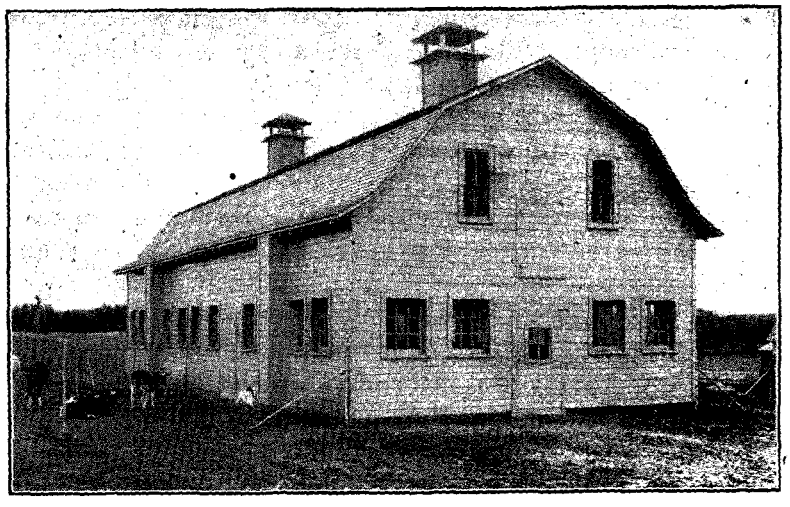

PLATE 4.—Calf barn used expressly for calves at the Kansas State Agricultural College. This barn contains the small pens with stanchions, as described in the bulletin.

raising the calves by letting two of them nurse one cow. Often there are cows in the herd that are hard to milk, and such cows are turned over to the calves. In such cases only the very best heifer calves are raised. Where there is ready market for the whole milk it is a losing proposition to feel whole milk to a calf that will finally sell on the market for veal.

Another solution of this problem is to feed the minimum quantity of milk, getting the calf to eat grain, or gruels made of grain, as early as possible. Some feed the milk for two or

three months, and at the end of this time the calf is entirely fed on dry feed. This is probably the best method to follow.

There are a great many milk substitutes advertised on the market to-day, but these are usually expensive, and for the best results some milk should be fed with them.

STABLING THE CALVES.

The calves should by all means be kept in clean, well-lighted and ventilated stables. Where plenty of barn or shed room is at hand, the best method for handling the calves is to keep each one in a separate pen. A pen three feet wide, five feet long and three feet high is large enough to accommodate the calf until it is four to six months old. There are many advantages in keeping the calves in this manner. The calves will not suck each other's ears when they get through drinking their milk, and thereby cause the ears to freeze in cold weather, and they can be given more individual attention. They can be fed as individuals. A case of scours among calves may be located more readily in this manner, and a remedy may be applied at once. Where there is less room to be had, the stanchions will usually give the best results. A stanchion made of wood will be entirely satisfactory. The stanchion should be made from 3 to 3½ feet high and 18 to 24 inches from center to center, and the neck space should be 4 to 5 inches wide. The stanchion is built in the same manner as the old-style rigid stanchion. The feed manger may be made 12 to 14 inches wide, or wide enough to accommodate the milk pail. The calf should be fastened while it drinks the milk, and the grain fed immediately afterward. By the time the calves have eaten the grain they will lose the desire to suck each other's ears. A part of the manger may be used for hay, but the calves should be loosened from the stanchions after they have eaten their grain. The calf pens and stanchions should be built in the south side of the barn, where plenty of sunshine and light can be had. There is no disinfectant that will take the place of sunshine. During the summer the calf should have access to a pasture lot where there is plenty of shade.

SPRING AND FALL CALVES.

The best time of the year to have the calves dropped will depend somewhat upon the market for the product. In the cheese-making district, or where the cream is sold for ice-

cream making, it is more profitable to have the cows freshen in the spring. Where butter or cream is sold, or where milk is sold for market purposes, it is better to have the cows freshen in the fall. Fall-dropped calves that are to be hand-raised will usually make a better growth than calves born in the spring. During the fall and winter more time can be given to the care of the calf, and when spring comes it is ready to make good use of the pasture, and will not be any further trouble or care. In the fall, when calves are housed in their winter quarters, they are strong, and on account of being accustomed to subsisting on coarse foods, they will do well on dry feed. The spring-dropped calf is compelled to subsist on dry feed after it is weaned, and will not take hold so readily, thus suffering a set-back in its growth.

CALF SCOURS.

The most common disease of the young calf is indigestion, or scours. Naturally the digestive system of the young calf is weak and is very easily upset. The old adage, "An ounce of prevention is worth a pound of cure," is very applicable here.

There are two kinds of scours that commonly affect the young calf—white scours, sometimes called calf cholera, and common scours, caused from indigestion. The white scours is a contagious form, and if the calf becomes affected at all it is within a few days after birth. The germs gain entrance to the body through the umbilical cord soon after birth. The remedy for this disease is a preventive one, and the best way to insure against it is to keep the stalls and pens clean. Stalls used for calving purposes should be cleansed and disinfected after each calf is born. Additional precaution should be taken by tying a string around the navel cord of the young calf immediately after it is born, and applying some good disinfectant to the exposed parts.

The common scours, or indigestion, may usually be traced to faulty methods in feeding the young calf. The principal causes are as follows: overfeeding, feeding cold milk, irregular feeding, feeding alfalfa or other highly nitrogenous hay to the young calf, using dirty pails, and dirty stables.

The first sign of indigestion or scours among calves is usually the characteristic foul-smelling dung. When a calf shows

the first signs of scours the milk should be reduced one-half or more, and then gradually increased again as the calf improves. This method of treatment is usually sufficient to check a mild case. There have been many remedies suggested for treatment of the scours, and all are used with more or less success. The feeding of dried blood to calves has proved very effective. This may be fed by adding about a teaspoonful of soluble dried blood to the milk and stirring it in well. Dried blood not only acts as a tonic, but often is fed along with milk at each feed on account of its feeding value as well as its value as preventive treatment against the scours. A fresh egg given to the calf when the scours is first noticed often checks the attack. Castor oil is also used with good results. Two tablespoonfuls is sufficient for a dose. This may be given as drench mixed with milk.