Circular No. 87 - Raising Dairy Calves

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Calves in Stanchions, U. S. A. C. Dairy Farm

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IMPORTANCE OF RAISING DAIRY CALVES

Too much importance cannot be given to the number and kind of calves raised. The life of an average cow is 6.5 years. To maintain the present number of cows in Utah about 15,385 heifer calves should be raised annually. One-half of all calves born are males and are usually disposed of in a few weeks; the other 50 per cent are females, from which selection must be made to maintain the herds. In many parts of Utah the number of dairy cows should be increased, and probably the best way to accomplish this is to raise carefully selected calves.

WHICH CALVES TO RAISE

In every farming operation profitable production is of greatest importance. To fit into this class, cows must produce enough milk and butterfat to return a good profit above feed costs. After several generations of straight breeding, using purebred sires continuously, calves are much improved from the original native cattle. Even after years of breeding it is impossible to select those calves which will always be the best producing cows. In one known instance of three full sisters in a family of purebred Jerseys, two produced 40 pounds of milk daily with their first calves while the third was sold to the butcher because she gave barely enough milk to feed a calf. Even though it is impossible always to select the best by keeping the heifers from the better families of females sired by good bulls, it is possible to get enough good ones to maintain the herds. When a good breeding bull is found, it is often possible to select a large number of his daughters and thus increase the production from one generation to another. In spite of the fact the best cows cannot always be determined when they are calves, it is generally agreed that selection from the better cows is the surest and best way of maintaining and improving dairy herds.

CARE OF THE COW AND CALF AT CALVING

To insure proper care at time of calving, careful breeding records should be kept on all cows. The cow should be placed in a clean, dry box stall two or three days before the birth of the calf. All old litter should be removed from the stall and the walls and the floor given a thorough disinfecting. Precaution against abortion and white scours germs is always timely. If the floor of the stall is of cement or board, a 5 per cent solution of coal tar product is used as a disinfectant; all parts are thoroughly sprayed. If the stall has a dirt floor or if the weather is too cold for spraying, air-slaked lime sprinkled generously over the floors will be satisfactory. After the cleaning, a liberal amount of dry, clean straw, is added, and the stall is ready. The stall should always be kept thoroughly dry. Often a stall will have dry straw on the surface but the underpart will be damp. When a newly-born calf lies on such straw for any length of time it may become chilled and sick. The ventilation is arranged for ample fresh air but with no drafts.

During parturition, the cow should be carefully watched. When the calf is dropped every effort should be made to get it dry and warm as quickly as possible.

1Contribution from Dairy Department, Utah Agricultural Experiment Station.
2Station Dairy Husbandman.
If the mother fails to lick it vigorously, bran should be sprinkled over its body. This usually stimulates the licking and drying process. If the weather is extremely cold, the attendant should rub the calf with straw or burlap to hasten the drying and warming process.

In case the calf is weak or the mother's udder is hard to reach, some assistance is often necessary and advisable in getting the calf to suck for the first few times. If the calf gets a good feed of its mother's milk it usually will get along all right. The attendant should always see that the calf gets some of the first milk (colostrum) to properly stimulate the digestive tract. In case the dam should die before the calf can get this colostrum milk, which is nature's physic, a tablespoonful of castor oil should be administered. This will have a stimulating effect on the digestive tract; it should then be followed with milk as near like the mother's as possible.

It is advisable to tie off and disinfect the navel of the calf soon after birth. The raw exposed part of the navel cord is painted with tincture of iodine, using a small brush or soft cloth. If not available, a 5 to 10 per cent solution of coal tar disinfectant is mixed in a cup and held up to the belly close enough to immerse the navel cord. To prevent bleeding a soft cord or band is tied snugly around the navel cord close to the belly. If this is not done calves lying in deep straw often bleed to death after all apparent danger has passed. To prevent disease germs from entering the body, the navel should be disinfected until it is thoroughly dry.

**SEPARATION FROM THE COW**

There is slight difference of opinion as to the best time to take a calf away from its mother. The best practice in the United States seems to be to leave the calf with the dam for two or three days, during which time it will suck every few hours, taking only a small amount at a feeding. If the calf is especially valuable and the weather extremely cold, or if the calf is weak, it may be advisable to leave it with its mother longer than three days. A strong, thrifty calf may be taken from its mother when 36 hours old. To teach a calf to drink easily without setting it back by starvation, it should not be with the mother much longer than 48 hours.

**TEACHING THE CALF TO DRINK**

When ready to be weaned the calf should be placed in a pen by itself. It is usually advisable to leave the calf for at least 12 hours after taking it from its mother before attempting to feed it. It may be necessary to starve stubborn calves for 24 hours. The best plan for teaching calves to drink is the oldest and commonest one practiced. A quart of the mother's milk is placed in a clean calf pail; the calf is backed into a corner of the pen and his nose is put in the pail. This is best accomplished by first wetting the fingers in the milk and then putting the fingers in the calf's mouth. The hand is drawn down as it begins to suck, the fingers being gradually withdrawn. When the calf gets a few swallows of milk from the pail it is not difficult to complete the teaching. If he raises his head immediately when the fingers are withdrawn, care and patience must be exercised to repeat the performance. In case the calf will not suck the fingers, some milk is put in a cup or on the palm of one hand; the calf's mouth is forced open with the other hand and a small quantity is poured on its tongue. This usually starts the calf sucking vigorously.

In the dairy sections of Europe the universal custom followed is to take the calf away from the mother before it sucks at all. The attendants are especially careful to see that the calf gets the colostrum milk to stimulate the digestive tract.
in the first few feeds, after which it is fed regularly on the mother's milk. In some herds care is taken to avoid giving too much succulent feed to cows whose milk is being fed to calves.

**BIRTH WEIGHT OF CALVES**

The breed determines the birth weight of calves and the weight largely determines the amount of milk for the first feeding. The breed averages are:

- Holsteins: 90 lbs.
- Brown Swiss: 90 lbs.
- Ayrshires: 70 lbs.
- Guernseys: 65 lbs.
- Jerseys: 65 lbs.

Holsteins regularly weigh more than 100 pounds and occasionally as little as 80 pounds. A similar variation is found in the other breeds.

**WHOLE MILK PERIOD**

The larger calves should receive 6 to 8 pounds of the mother's milk the first day; the smaller calves, 3 to 6 pounds. If the weather is not below 10 degrees above zero, two feedings daily should be sufficient. If the weather is zero or below three feedings daily will be much more satisfactory, and calves will usually do better on more frequent feedings for the first 10 days or two weeks. When the calves are adjusted to this practice, the milk should be gradually increased with 0.5 to 1 pound daily, as fast as the calf can take it. The calf should never have its appetite entirely satisfied. The amount of increase in the milk must be governed largely by the judgment of the attendant. The odor and firmness of the feces are the best guides for judging the health of the calf.

To keep the calves growing uniformly and in the best of health, regularity of feeding is about as important as the amount of milk given at each feed. It is good practice to feed the calves at approximately the same time each day. During
cold weather the temperature of the milk should be carefully watched. Three to five pounds of milk poured into a cold pail and carried any distance to the calves may become many degrees colder than it should be for best results. In cold weather if there is more than one calf, two pails are used for feeding. All the milk is put into one pail after it has been carefully warmed with hot water; some hot water is carried in the other pail, giving it to the calf immediately. This method should insure the calf's getting the milk as warm as possible.

At no time is it necessary to feed more than 14 to 16 pounds of whole milk daily for good growth. In case of a prospective herd bull or show calf it might be desirable to increase the daily amount up to 18 and 20 pounds.

**CHANGING TO SKIM MILK**

Normal growth is all that any average breeder can hope to attain in his calves, and this can be secured by changing from whole to skim milk, beginning when the calf is 3 weeks old. This change is made gradually so that the calves can be changed from whole to skim milk ration at the age of 4 to 5 weeks. Because the fat is taken out of the milk, the feeder should not increase the skim milk above the whole milk feedings until the calf is properly accustomed to the change.

![Calf in excellent condition raised on skim milk.](image)

At no time is it profitable or especially beneficial to feed the calf more than 18 to 20 pounds of skim milk daily. If skim milk is available and not too expensive, it is good practice to feed the calves for five to six months. If the skim milk is purchased from a commercial dairy, it should be pasteurized, to avoid contagious disease and too early souring.

**CLEAN PAILS**

Another necessary daily precaution is to see that all pails are absolutely clean. Calf pails should receive the same attention as regular milk pails; if possible, they
should dry in the direct sunshine. In the winter they may be scalded and rinsed with boiling water and set to drain on a clean shelf.

The following practice should be observed carefully and then there will be little trouble in raising calves: (1) **THE PROPER DAILY AMOUNT OF MILK, WHICH IS DETERMINED BY ACCURATE WEIGHT OR MEASUREMENT;** (2) **THE TEMPERATURE OF THE MILK WHICH SHOULD BE AS NEAR 90° FAHRENHEIT AS POSSIBLE;** AND (3) **ALL MILK SHOULD BE FED FROM ABSOLUTELY CLEAN PAILS.**

**WATER FOR CALVES**

During the time they are being fed milk, it is essential that young calves have water before them at all times or at regular intervals. Occasionally, if both milk and water are fed in pails, a calf does not readily detect the difference. The feeder should be careful to see that no calves gorge themselves on water. This is not likely to happen if water is available at all times.

**GRAIN FEEDING**

Since the fat has been removed from the milk, fed to calves, a substitute should be added. Calves will begin to take small quantities of grain when they are a week to 10 days old. At first the amount should be almost negligible; an ordinary handful, about \(\frac{1}{8}\) pound, will satisfy them and at the same time provide the necessary nutrients. The grain should be fed immediately after the milk has been fed. A quantity of grain should be available in a clean box near the calf pens so that when the empty pail is taken from the calf the grain can be placed in the manger. The milk creates a desire for food, and the calf usually eats the grain in a few minutes. By the time the grain is eaten the mouth of the calf is dry from the milk and there is no longer the desire to suck something. The calf will usually lie down quietly after eating the grain. If the grain is not given immediately following the milk, calves often develop the habit of sucking each other. By the time the calf is 6 to 8 weeks old, it will eat about 1 pound of grain daily; when it is 6 months old, 3 to 5 pounds is ample.

Whole oats is one of the best known grains for calves. It is grown quite generally, and the calves seem to digest it thoroughly when fed whole. If fed alone it is satisfactory, but when mixed with ground barley and bran (equal parts by weight) it makes a more nearly balanced ration. For Utah farmers this ration, or, if preferred, 2 parts oats and 1 of ground barley and bran, is the cheapest and most satisfactory ration. Another satisfactory grain mixture, but one which is more expensive for the Utah dairyman, is:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Ratio</th>
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</thead>
<tbody>
<tr>
<td>Cornmeal</td>
<td>3 parts</td>
</tr>
<tr>
<td>Ground oats</td>
<td>3 parts</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>1 part</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>1 part</td>
</tr>
</tbody>
</table>
FEEDING HAY AND PASTURE

The appetite of most calves for hay is about the same as for grain. They eat small quantities at first, but when they are 6 months old the amount has been gradually increased to 3 to 5 pounds daily. Calves should have access to hay at all times. It should be changed regularly; moldy hay often causes serious digestive troubles. It is not necessary to feed the brightest and leafiest alfalfa to young calves since it may be a contributing factor for scours. Good clover or mixed grass hay is desirable and may be fed alternately with alfalfa. Most calves do better when fed dry feed for the first three months. Spring-born calves should not be turned into pasture when too young. A small slatted hayrack attached to the wall is desirable for feeding hay.

FALL- vs. SPRING-BORN CALVES

The fall-born calf has a number of advantages over the spring-born calf. It can be kept growing satisfactorily on skim milk, grain, and dry hay until 5 to 6 months old; then in the spring it can be turned out to pasture where it will continue to grow on nature's most palatable feed. The spring-born calf has grass along with the other feeds; when it is 5 or 6 months old and must be weaned from milk, green grass is not available. August and September are not satisfactory pasture months. Because of short grass, heat, and flies, these factors are not conducive to a steady, normal growth. For the first 3 to 5 months the calf does not grow any faster on grass, but during the second six months it makes much better growth on grass than on hay.

A generally accepted practice is to have the heifers come into milk at about 2 years of age. The fall-born calf reaches calving age when most profitable as a milk producer. Calves pastured when young should have access to plenty of shade during hot weather. During the day a darkened dry, well-bedded, pen will be of material help; they can thus graze during the night. Calves to be shown at the fall shows should be penned up during the heat of the day and turned out at night with a light blanket on to keep the hair sleek and the skin soft.

SALT AND MINERALS

Free access to salt is as essential for calves as for other animals. It should be kept in a clean box in a convenient place. Coarse salt or sulphur blocks are most desirable for young calves. There is a wide variation of opinion regarding the feeding of minerals to calves. The kind of ration received undoubtedly has considerable to do with the supply of calcium and phosphorus. To provide an adequate amount of these substances a supply of finely ground, steamed bone-meal should be supplied.

Calf Ties, Pens, and Stanchions

In many modern breeding establishments calves are housed in individual pens or small box stalls. Each pen is provided with a water cup, a manger for hay and grain, and a box for salt and mineral. Calves are placed in these pens when 2 or 3 days old and may be left there for several months without getting out. The individual pen prevents the calf from developing the habit of sucking; it can also be watched more carefully for digestive troubles. This method of housing is generally accepted as the best plan by most good breeders, but it is rather expensive. The arrangement most commonly used is a large box stall or calf pen where the calves are kept together. On the side of this large pen next to the alley should be a row of stanchions for holding the calves during feeding. (Cover cut) For
stanchions and partitions regular pipe fixtures are most desirable, but these can be made of wood. They may be of the stationary type, about 36 to 44 inches high and 28 inches from center to center, with a space of 4 to 5 inches for the neck. A feed trough, 12 to 14 inches wide 6 to 8 inches deep, should be built in front of the stanchion to hold the feeding pail and grain.

At feeding time the milk pail is placed in the manger in front of the stanchion, and as the calf drinks it is fastened in. After the calf has finished the milk, the pail is removed and the grain placed in the manger. The stanchion can then be released and the calves allowed to run together in the large pen. It is absolutely necessary to feed each calf separately to know just how much it is getting; and there is no cheaper nor handier way than the stanchion method.

For summer feeding in pasture a small section of stanchion can be constructed as suggested, except that it is made of lighter material and fastened on to the fence; thus, each individual calf can also be watched in the summer.

**IDENTIFICATION OF CALVES**

All calves should have some mark of identification at an early age so as not to lose their inheritance. In purebred herds this is absolutely necessary. Straps with metal numbers are often fastened on the necks of calves where they remain until the calves are 6 to 8 months old, when the registration identification or “tattoo” is taken care of. Another and more common practice is to use ear labels, making careful record of the numbers. Labels often pull out easily, especially if calves have the habit of sucking each other’s ears. There is a special make of label placed in the top of the ear which is usually safe.

**DEHORNING**

Dehorning mature cows is a bloody, disagreeable practice. Some breeders prefer leaving the horns for show cattle, arguing that they add a great deal to the appearance of the animal. This is true, yet many first prize animals are shown without horns. The proper time to get rid of the horns is when the calves are young. The calves should be carefully watched during the first week or 10 days; when the button is well-developed it should be treated with caustic. The hair is clipped clean from around the horn with a pair of sharp scissors until a clean surface is exposed. Vaseline or some other salve is applied to the skin and hair at the base of the horn, leaving the top surface exposed. The vaseline prevents the caustic from running down on the skin and causing undue burning. Caustic soda or caustic potash in the stick form is available at any drugstore. One end of a stick is wrapped with paper to keep it from burning the fingers; the other end is then dipped in water and applied to the tip of the horn and rubbed vigorously until signs of bleeding are shown. In a few days a scab will form on the horn, but it soon drops off and the horns are killed permanently. Too much water on the caustic will cause it to run down on the skin or into the eyes of the calf. If a good scab does not result from the first treatment, a second application should be made after about three days.

**MILK SUBSTITUTES**

In most of the important dairy sections of Utah whole milk from the farm is sold and there is no skim milk for calf feeding. As a result, for the first six months most of the calves are poorly developed. In many sections, the growth of the cows is thus permanently affected. Some dairymen feed whole milk and often are extravagant in their feeding; their calves cost too much—more than is necessary.
Many agricultural experiment stations in the United States are attempting to determine the best and cheapest skim milk substitute which will assure normal growth in dairy heifers at one year of age. The rations and methods reported are based on work done at the New Jersey Experiment Station.

The calves are left with their mothers for 36 hours; they are then placed in individual pens where they receive whole milk in varying amounts, three times daily, depending on the size and thriftiness of the calves. At the end of the first week, a grain mixture and bright leafy alfalfa hay are placed before them. When one week to 10 days old they begin to eat small quantities of grain and hay. At 21 days the whole milk is slightly reduced and the calves have access to fresh water along with the grain and alfalfa. At 30 to 35 days the whole milk is entirely eliminated from the ration, the calves depending now on the grain mixture, alfalfa hay, and fresh water.

The grain is weighed out to the calves each morning and placed in individual pens. Alfalfa is also weighed in and out of the racks daily. For the first month,

the average calf receives a maximum of 6 pounds of whole milk per day. When the calves are one month old they are consuming daily 1 pound of the grain mixture. This amount is increased 1 pound per day for each month up to the fifth month, when they reach the maximum grain allowance of 6 pounds daily. Alfalfa is fed freely; however, when 6 months old most calves do not consume more than 3 pounds a day. After this, the amount varies considerably. Many different mixtures were used in the experiment, but three of them seem to be more practical for Utah conditions:

Ration No. 1.—This ration is made up of the following:

Yellow cornmeal ...................................................... 20 lbs.
Wheat bran ............................................................ 10 lbs.
Skim milk powder .................................................. 20 lbs.
Ground oats ............................................................ 30 lbs.
Linseed oil meal ..................................................... 20 lbs.
Bone meal (finely pulverized, steamed) ......................... 1 lb.
Limestone (finely pulverized) ..................................... 1 lb.
Salt ................................................................. 1 lb.

The group of calves fed this ration at 6 months of age were 97.7 per cent normal for height and 92.4 per cent normal for weight; at one year, they were all larger than normal.

**Ration No. 2.**—A second lot of calves received a ration of the following grain mixtures:

- Yellow cornmeal ........................................ 25 lbs.
- Ground oats ........................................ 37.5 lbs.
- Wheat bran ........................................ 12.5 lbs.
- Linseed oil meal ...................................... 25 lbs.
- Salt .................................................. 1 lb.
- Bone meal (finely pulverized, steamed) .......... 1 lb.
- Limestone (finely pulverized) ....................... 1 lb.

At 6 months of age these calves were 97 per cent normal for both height and weight.

**Ration No. 3.**—A third group was fed a mixture of the following:

- Yellow cornmeal ........................................ 25 lbs.
- Ground oats ........................................ 37.5 lbs.
- Wheat bran ........................................ 12.5 lbs.
- Linseed oil meal ...................................... 12.5 lbs.
- Soluble blood flour* .................................. 12.5 lbs.
- Bone meal (finely pulverized, steamed) .......... 1 lb.
- Salt .................................................. 1 lb.

Blood meal as commonly put on the market does not take the place of the blood flour recommended in Ration No. 3. This ration seemed to yield slightly better results than Rations Nos. 1 and 2.

The authors have this to say about substitutes for milk:

"Calves can be successfully raised on a dry grain mixture, after being weaned from milk at thirty days of age. On a sound, dry grain mixture and alfalfa hay fed liberally, these calves will be 100 per cent normal for weight and height when compared to Eckles's normal figures. A dry grain ration will cut the feed costs on raising calves to six months of age from $25 to $50, depending on the feeding method used. This method of feeding saves labor costs, and does not harm the breeding or productive ability of the individuals."

**COMMON DISEASES OF CALVES**

Calves born from clean healthy cows, in dry, well-bedded pens, should not contract any immediate ailments.

**Scours from Indigestion**

Diarrhea, or common scours, is the most frequent ailment of young calves. It is usually the result of a digestive disturbance and may be caused from overfeeding, irregular feeding, drinking out of dirty pails or boxes, milk too rich in fat, or milk of different temperature, especially when it is too cold. Like many other ailments, it is easier to prevent than to cure.

The first symptoms of the disease are looseness of the feces and a noticeably

*Swift Company's soluble-blood flour is recommended by the New Jersey Agricultural Experiment Station (correspondence between C.B. Bender and author).

*See footnote 3.
offensive odor. The calf usually appears dull and lacks appetite. As soon as the first symptoms appear, the calf should be isolated and its milk ration reduced approximately one-half. If the calf is being fed considerably bright green alfalfa hay it should be replaced by grass hay until the trouble disappears. Eating too much grain may easily cause scouring; therefore, it is highly important that the amount fed be carefully checked. A good dose of 1 to 3 tablespoons of castor oil mixed with 1 pint of milk should be given to each calf suffering from scours. The amount given will depend on the size and age of the calf. This will remove any irritating material in the digestive tract and will give the new milk a chance to work normally. Following the action of the oil, a teaspoonful of a mixture composed of salol and 2 parts each of subnitrate of bismuth and bicarbonate of soda is given. If the first dose does not produce results, it can be repeated every 6 to 8 hours until the diarrhea is checked. When calves start with scours it is often difficult to prevent a second occurrence. One tablespoonful of lime water to a quart of milk is often given at each feeding as a preventive measure. There are several commercial tablets on the market for calf scours or diarrhea which are effective when fed in the milk.

White Scours

White scours, or infectious dysentery, is much more dangerous than the other type of scours. There seems to be no effective medicinal treatment and the mortality rate is, therefore, high. The first symptoms appear soon after birth in the form of white, foul-smelling droppings. The calf becomes dull and listless, loses its appetite, refuses to suck, and usually dies within two to four days.

Prevention is the only remedy for this disease. After it once appears in a herd there is grave danger of many more cases unless the pen is thoroughly cleaned out and disinfected with a good coal tar spray and then allowed to dry thoroughly before fresh bedding is added for the next cow. A competent veterinarian should always be consulted when white scours make its appearance.

Lice

Cattle lice are usually most common during late winter and early spring. All cattle may have lice in some form, but the greatest apparent loss is in rather poorly nourished young calves and old animals. It is easy to see the lice on light-skinned calves, and on any calf they are apparent where the hair is rubbed off. In cold weather, a number of treatments with a regularly prepared louse powder will usually cure the trouble. In warm weather, or in a heated room, an effective measure in controlling lice is a 2 per cent solution of creolin applied with a spray pump or brush. There are also commercial standard dip solutions. The directions on the containers should be carefully followed. For either the powder or liquid treatment, additional applications should be given when the eggs hatch, which is in from 10 to 14 days.

Ring Worm

This is a skin disease which appears first as round spots around the eyes and muzzle; it then spreads over the head, neck, and other parts of the body. It spreads rapidly and causes considerable trouble. On the affected parts the hair comes out and a grayish-white scaly crust is formed on the surface. For treatment, the scales are rubbed off with a stiff brush or with soap and water; the surface is then thoroughly painted with tincture of iodine. In extreme cases a second application of iodine may be necessary. To prevent further spread of the disease, stalls in
which the calves have been housed should be thoroughly cleaned and disinfected or whitewashed.

**Pneumonia**

Pneumonia is usually induced by chilling and sometimes follows scours which has weakened the vitality of the calf. Poorly drained pens where dampness accumulates beneath the straw easily causes pneumonia. Pneumonia is characterized by lack of appetite, rapid breathing, constipation, and a high temperature (105 to 106°F.). The affected calf should be blanketed and placed in a clean well-ventilated box stall free from drafts. A mustard plaster over the lungs may be applied and a laxative given to keep the bowels open. If the calf recovers it will be in a weakened condition and must be carefully handled to get back on normal rations again. In case of pneumonia it is always advisable to consult a qualified veterinarian.

**SUMMARY**

1. Calves worth raising must come from high-producing parents of good type.
2. Special care of the cow and calf at time of birth are necessary for successful calf-raising.
3. The calf should be left with its mother for at least two days so that it will get the colostrum milk.
4. Fresh, clean, whole milk should be fed at a temperature of 98 degrees Fahrenheit for the first two or three weeks, depending on the calf.
5. The change from whole milk to skim milk or milk substitute should be made gradually.
6. All the milk to calves should be weighed, care being taken not to over feed.
7. Clean pails and pens are extremely necessary for the proper growth of calves.
8. All milk or substitutes should be fed at regular intervals and at a uniform body temperature.
9. Calves should have free access to hay and grain as soon as they will eat it. As the calves grow older the grain is gradually increased.
10. All calves should be tied at feeding time so as to feed separately.
11. Calves should be kept in a good growing, thrifty condition. Stunted calves do not make as good cows as those properly grown.
12. A dry mixture is conducive to normal and economical growth.
13. Every precaution should be taken to prevent calves from getting sick or becoming infested with parasites.

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