

S
534
78 M48
174

Raising

DAIRY CALVES

to Breeding Age



4-H Circular 174
Reprint 3/67/3M
University of Missouri
Extension Division

Raising

DAIRY CALVES

to Breeding Age

Prepared by:
E. T. Itschner
Extension Dairyman

SELECTING A BREED

Which breed will you have?

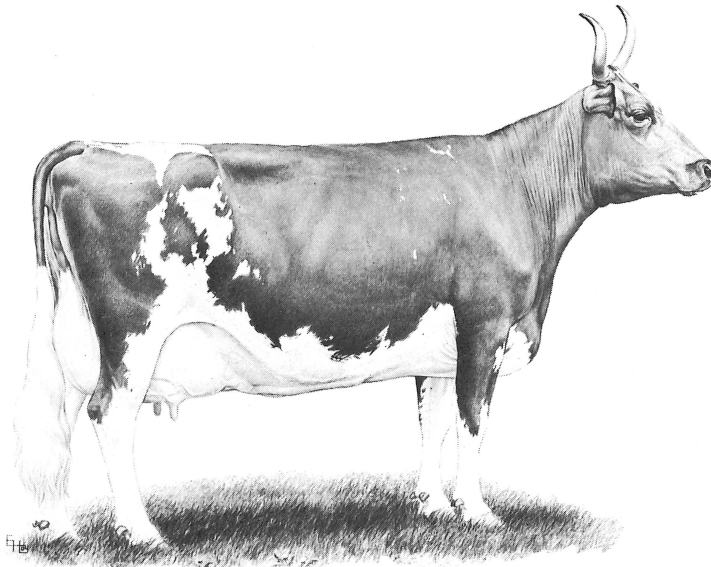
In selecting a dairy breed, pick one that you like. There are good animals in all breeds and each breed has certain advantages. Study the characteristics of each breed and choose the one that best fits your conditions and preference. Keep in mind the type of

market you will have for milk and surplus animals, the popularity of the breed in your community, and whether or not there is a good local breed promotion organization in your area. There are five major dairy breeds in Missouri as well as two dual purpose breeds.

Ayrshire.

The Ayrshire breed originated in Scotland and has been bred for hardiness and grazing ability. This breed is about medium as to milk production and percentage of butterfat. The milk tests about 4 per-

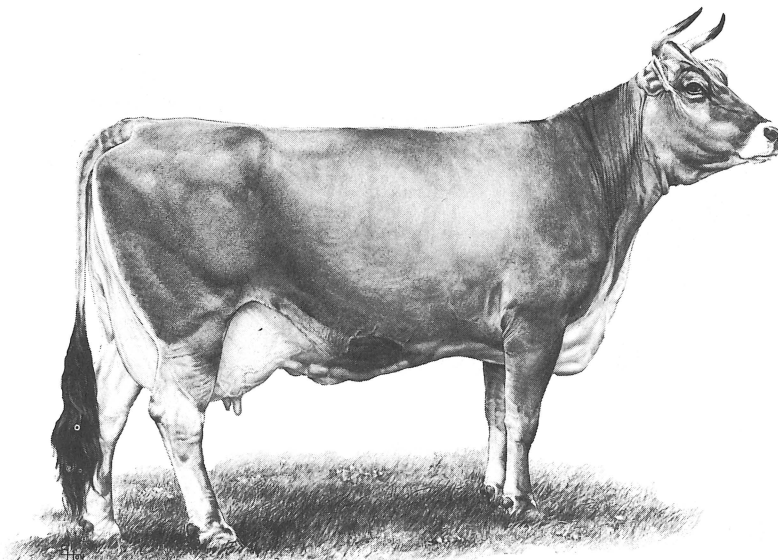
cent. Color markings are cherry red or brown and white; body lines are straight; the horns are long and upstanding. Udders are well supported and symmetrical. Cows average about 1100 pounds, bulls 1700 pounds. Calves weigh 60-80 pounds at birth.



Brown Swiss.

Brown Swiss are large animals, cows averaging about 1300 pounds and bulls 1800 or more. They are thrifty and rugged, and are persistent milkers. Milk production is relatively high and the milk tests about

4 percent. Color varies from very light to dark brown with lighter grey-brown markings around the muzzle, ears, and along the back bone. Brown Swiss in the United States are all descendants of fewer than 200 animals imported from Switzerland. Calves weigh about 65 to 90 pounds at birth.



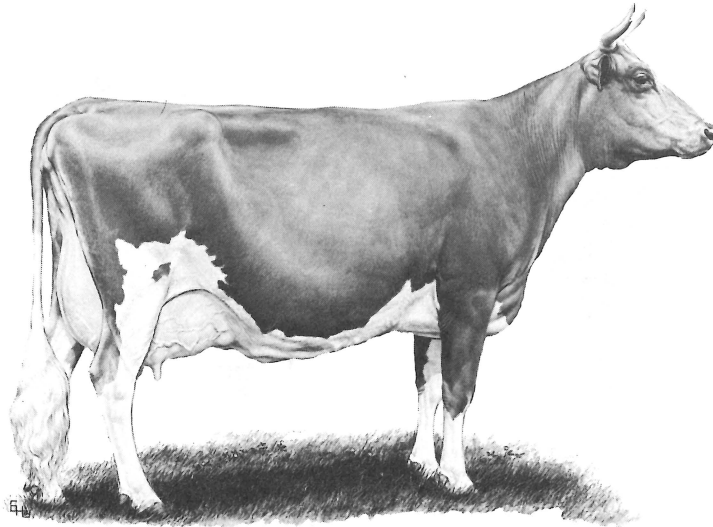
The pictures of the breeds, except the Red Poll, are from paintings made for a special project of the Ralston Purina Company, St. Louis, Missouri, and are reprinted here through their courtesy.

Guernsey.

The Guernsey cow is noted for the golden color of her milk. The milk tests above average, slightly less than 5 percent.

The native home of the Guernsey is the Island

of Guernsey. Color markings vary from fawn to a deep orange usually with some white markings. The nose should be buff color. Tongue and switch are usually white. Guernsey cows weigh about 1100 pounds, bulls about 1700. Calves weigh 60 to 80 pounds at birth.



Holstein-Friesian.

Holsteins are noted for their size and high milk production. The milk averages about 3.6 percent but-

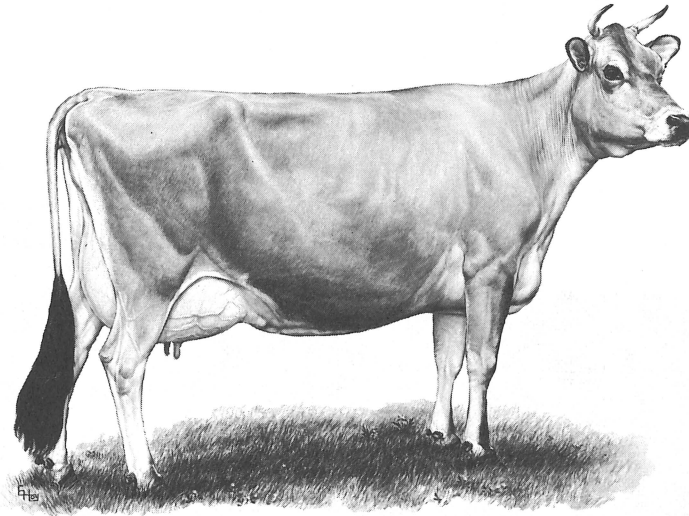
terfat. Holsteins are native to Holland. Color is distinct black and white. Average mature cows weigh 1300 to 1400 pounds and bulls 1800 to 2000 pounds. Calves weigh 70-105 pounds at birth.



Jersey.

Jerseys are noted for their refinement and uniformity of type and rich milk which tests about 5.2 percent. Cows average 900 to 1000 pounds, bulls

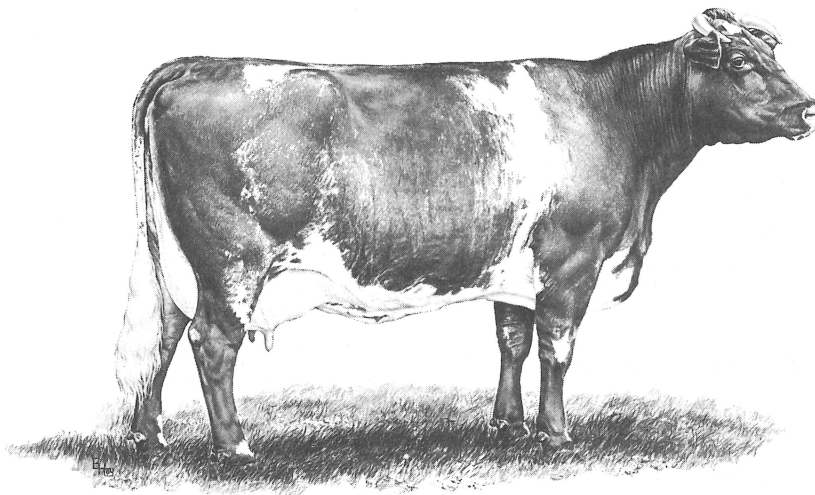
1500. Calves weigh 40 to 75 pounds at birth and mature early. Color varies from cream or light fawn to almost black. Some have white markings. The Island of Jersey is their native home. Importations to this county have been numerous.



Milking Shorthorn.

This breed originated in Northeastern England. They are considered a dual-purpose type producing milk with an average butterfat content of 4 percent. Steer calves have a value for beef purposes, and cows

have a good salvage value when through breeding and milking. Milking Shorthorns have rugged constitutions and handle easily. Colors are red, white, and roan. Cows weigh about 1400 pounds and bulls about 2200 pounds. Calves weigh 60 to 80 pounds at birth.



Red Poll.

This dual-purpose breed originated in Eastern England. Mature cows weigh about 1400 pounds and mature bulls about 1900 pounds. The preferred color is a cherry red; however, the color varies from a light to a dark red. No white is tolerated, except for the switch of the tail and udder. Heifers of normal growth freshen between 27 and 30 months of

age. Red Polls do not rank as high as the dairy breeds in milk and butterfat production. The milk averages 4.3 percent butterfat. Steers rank high as meat producers, as they are blocky and dress out well.

A few minor breeds of dairy cattle are scattered over the United States. The most important of the minor dairy breeds are the Dutch Belted, the Red Dane, French Canadian, and the Dexter and Kerry breeds.



SELECTING A CALF

When you are selecting a calf for a club project or for replacing a cow in your herd it is well to have in mind what you want in the mature animal that you hope develop from the calf. No doubt you will hope to produce a cow:

1. That is a good producer—profitable;
2. That has good type—you'll be proud of her;
3. That will remain healthy—stays on the job;

4. That will have a long production life and freshens regularly;
5. That has a good disposition and milks easily.

The first thing to do, then, is to look for a herd or herds that demonstrate these qualities, *under the same kind of conditions that will prevail in your herd*, and one on which records have been kept for a number of years.

In such a herd, you will have a better chance of getting a calf that will develop into what you want.

Next, look for a cow family in the herd that is outstanding in the qualities you want. A cow family may be a cow, her daughters, and granddaughters, that are uniformly desirable showing that the foundation stock not only is desirable, but that it reproduces in kind.

Don't neglect to study the sires used in the herds. Their daughters and their half sisters speak for them.

Of course, you will want to pay particular attention to the sire and dam of the calf, but don't forget that the rest of the family count, too. Pick a calf out of a uniformly good family in preference to one that may be the daughter of the only good cow in a family.

The more progressive herds will have a production testing and classification program as well as breeding records to prove their worth. Examining the records is the only way to be sure that the herd has good production type and health.

If you are selecting a young calf, you cannot tell too surely by looking at the calf itself what it will turn out to be. Assuming that it is from a good cow family and from a good herd with records, then you will want to look at the calf for these signs of quality. It should:

1. Be of average size for the breed at its age;
2. Be alert, bright, vigorous with a good appetite;

3. Have a glossy coat and soft hide;
4. Reasonably straight of leg and top line;
5. Not stunted or paunchy looking;
6. Be lean but not emaciated in appearance.

We can expect heifers, as yearlings, to be more "leggy" and sometimes rough in appearance. They usually smooth up as they approach maturity. In general, select a heifer that is thrifty and vigorous and of average size for its age and breed. It should have a straight top line from withers to tail head. It should have good length and depth of barrel, ribs well sprung and open. Withers should be sharp, the neck long, refined, and tapering, fitting smoothly into the shoulders. It should be smoothly fitted in back of the shoulders. The rump should be long and level. The legs should be straight, the thighs thin and not beefy, the pasterns short and strong. The udder, although undeveloped in young heifers, should be symmetrical with high and wide rear attachment and carried well forward. Teats should be uniform in size, spaced well apart and hanging straight or slightly inward at the rear.

If you do a good job of picking the calf or heifer that you want, don't expect it to be the lowest priced animal in the herd. Remember that it costs just as much to raise an animal of poor quality. Remember too, that the heifer you select is supposed to be the foundation of your herd. In most cases, it will pay to get a good one, an animal that you will be proud to own.



THE NEW BORN CALF

When your calf is produced in the home herd, you will probably want to be on hand at its birth.

If the cow has had a suitable rest period of 6-8 weeks, has been well fed so that she is in good flesh, but not fat, and is of good health, she will have a good chance of producing a normal, healthy, calf. The cow should calve in a clean, disinfected, and freshly bedded box stall. In mild weather, a clean pasture that has not been used by other cattle recently is satisfactory.

As calving time nears, keep watch but avoid standing over the cow. This may cause her to be nervous and may interfere with normal calving. If the cow does not give birth to the calf in a reasonable time, be ready to give aid or call your veterinarian.

When the calf is born, the first thing to do is to see that the calf breaths normally. It may be necessary, at times, to quickly free its nostrils of mucus or membranes that might cause it to smother. Normally, the calf should get on its feet in about 15 to 30 minutes and be ready to nurse. See that the cow's udder is clean, so that when calf nurses, its first meal will be sanitary.

The cow normally will be licking the calf to dry its coat. If she fails to do this, wipe the calf dry with a cloth.

As soon as the calf is born, the navel should be disinfected with tincture of iodine. This may be done by pouring one or two tablespoons of iodine in a shallow clean jar lid or similar vessel and pressing it up against the navel as the calf is standing. The navel cord may be broken off to 2 to 4 inches before treating if necessary, but be sure not to get it too short. Treating the navel in this manner helps to prevent picking up an infection through the cord.

Be sure that the calf gets a good feed of the cow's first milk promptly. Usually the calf will nurse within 30 minutes. If it does not, in that length of time, help it to get started by holding it up. Occasionally, it is necessary to feed the calf by directing a stream of milk into its mouth or by feeding it with a nipple bottle.

The first milk or colostrum is most important to the calf. It acts as a laxative to clear out the digestive tract. Also, it contains antibodies which protect the calf from diseases and infections. Colostrum is an excellent source of nutrients and helps get the calf off to a good start.

The calf should remain with the cow for 2 or 3 days. During that time, it will be nursing the cow and getting full use of the colostrum. After 2 or 3 days, the calf may be removed to its own individual pen and taught to drink from a bucket or to use a nipple pail.



HOUSING

Your new born calf does not require elaborate quarters, but it should have plenty of fresh air and a dry bed. Damp unsanitary quarters and lack of ventilation are much more harmful than low temperature.

When the calf is separated from the cow, usually after two or three days, many dairymen find it pays to provide an individual pen for the calf. The pen is built with 3 solid walls, open at the top, and with a small stanchion at one end or a sliding panel that can easily be removed for feeding. A slatted false floor is often used to keep the bedding dry. Such a pen prevents drafts, but is well ventilated. Thus, the calf is kept dry and easily cared for.

Calves usually are kept in individual pens for at least a month and, preferably, as long as liquid milk is fed.

The individual pen may be located in a calf barn or in an open shed, away from the older cattle.

After the calf is on dry feed it can be penned with a small group of similar sized animals. A good dry bed and plenty of ventilation without drafts are still important in keeping the calf healthy.



FEEDING

Under most conditions, you will want to teach your calf to drink milk after its first two or three days with the cow. After that, the cow's milk is saleable and the calf will need only a small part of it.

Calves learn to take milk from a nipple pail or bottle with very little trouble. The nipple pail makes the calf drink more slowly and more naturally. There is some evidence that this may reduce digestion disturbances. Pails and nipples must be strictly clean and sanitary, otherwise the lack of sanitation may cause more trouble than fast drinking from a clean open bucket.

Teaching the calf to drink from a pail is easier if the calf has been away from the cow for about 12 hours. Place the calf in a corner of the pen so he cannot back away from you. You may find it easiest to straddle its shoulders to hold it. Dip two fingers in the warm milk. The calf will suck them readily. Gradually draw his muzzle down into the milk or raise the bucket as he is sucking the fingers. This may have to be repeated several times before the calf will continue drinking. Warm milk and patience are needed to teach the calf to drink.

For the first few feedings 1 to 1½ quarts (2 to 3½ pounds) of milk per feeding warmed to about

body temperature (100° F) will be sufficient. Never feed over 8 to 10 pounds of milk per day per 100 lbs. of body weight. Scours may result if the calf is overfed, if the milk varies in temperature, or if the milk and utensils are not clean. Regular feeding is important, too. Strong, vigorous, calves usually do well on two feedings per day. For weak calves, it may pay to divide the daily milk ration into 3 parts, fed 8 hours apart, until the calf gets well started.

If your calf weighs 80 pounds, he then should have 6 to 8 pounds of milk per day the first week. This will be 3 to 4 pounds per feeding for two time feeding or 2 or 3 pounds per feeding for three time feeding.

Don't guess at the amount of milk. Use a scales and know the weight of your calf as well as the weight of its milk fed. Avoid overfeeding and any sudden changes in amount, temperature, or kind of feed.

The calf may be continued on whole milk as its principal feed for perhaps as little as two weeks up to as much as two months or more, depending on the vigor of the calf, the price and supply of whole milk available, and which of several possible methods of raising you adopt. The following are several

methods of raising calves:

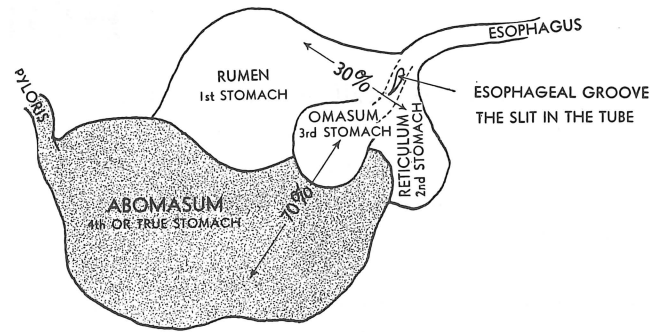
1. Limited whole milk—calf starter—hay and grain
2. Limited whole milk—skim milk—hay and grain
3. Milk replacers—calf starter—hay and grain
4. Whole milk—hay and grain
5. Nurse cows—hay and grain.

These various plans will be outlined in more detail in following paragraphs.

Keep in mind that there is no perfect substitute for whole milk during the first few weeks of a calf's life. However, raising the calf on whole milk is expensive. These substitute methods have been developed to lower the cost.

Calves must be fed differently than mature cows because their digestive system has not developed fully. Mature cows, sheep, deer, buffalo, and certain other animals are "ruminants". That is they have a "rumen" sometimes called a first stomach as part of their digestive system. The "rumen", along with the "reticulum" or second stomach, and the "omasum" or third stomach, are not found in other animals such as swine, dogs, horses or humans,

For mature cows and other ruminants, hay, grass, silage, and other roughage feeds, are the major part of their natural food. When swallowed, these rough feeds pass first into the rumen. Later, these are regurgitated and rechewed. We say the animal is ruminating or chewing its cud. When reswallowed the food goes back into the rumen where it is pre-digested by the action of bacteria and other micro-organisms which break down the rough fibrous hay or other forage which then passes through the second and third stomachs for moistening and mixing into the true stomach or "abomasum". Here the pre-digested material as well as the organisms which



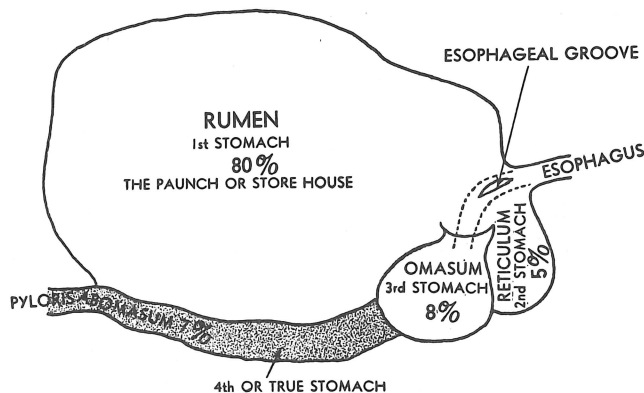
have acted upon it are digested or used by the cow for her needs for milk production, reproduction, and body maintenance.

Other important changes take place in the rumen beside fiber digestion. The bacteria and other rumen organisms are able to manufacture complete proteins, vitamins, and other essential materials, from the natural feed taken by the cow. Thus the cow is dependent on the bacteria and other organisms for some of the necessities of life.

Our young calf, on the other hand, does not have a developed rumen. In the calf the rumen is relatively small—only half as big as the true stomach. In the cow the rumen is about 10 times the size of the 4th or true stomach. Furthermore, the rumen does not function to any extent in the calf for the first two months, then it develops gradually as the calf makes more use of hay and other roughages and is able to ruminate. After about one year, the young animal's rumen has developed and continues to increase in size with further growth of the body. From that time on, the heifer can get along very well on good quality roughage alone.

Thus, the calf must be fed differently than a mature cow. The reasons for some of these differences are:

1. The capacity of the calf's digestive system is small. It can handle only small amounts at a time.
2. Complete proteins must be provided generously in the feed. Many plant proteins are incomplete. Protein from animal sources is normally more complete. Milk meets this need.
3. The calf cannot, at first, exist on highly fibrous feeds, such as hay or pasture.
4. The calf is dependent on its food for



needed vitamins (Except D, which may be obtained from sunshine). Vitamin A is the one most likely to be deficient, especially when the calf does not get whole milk and has not begun to take or does not get good quality hay. Rarely, some of the B vitamins may be lacking if good hay is not provided and if the calf is weaned at an early age.



LIMITED WHOLE MILK

This plan is popular where whole milk is sold at good prices. The calf is started on whole milk and taught to eat dry calf starter and hay as early as possible. The key point is to be sure the calf is taking enough starter and good quality hay for its needs before the milk is reduced or discontinued. This plan, while it does not produce the best growth at first, is a practical one for most dairy farms. Follow this schedule of milk feeding carefully:

POUNDS OF MILK TO FEED DAILY

	Small Breeds	Large Breeds
1-3 days	<i>with cow</i>	<i>with cow</i>
3-7 days	4-6	7-9
2nd week	5-8	8-10
3rd week	6-9	9-11
4th week	6-9	8-10
5th week	6-7	6-8
6th week	5	5-7
7th week	5	4
8th week	4	3
9th week	4	*
10th week	2	*

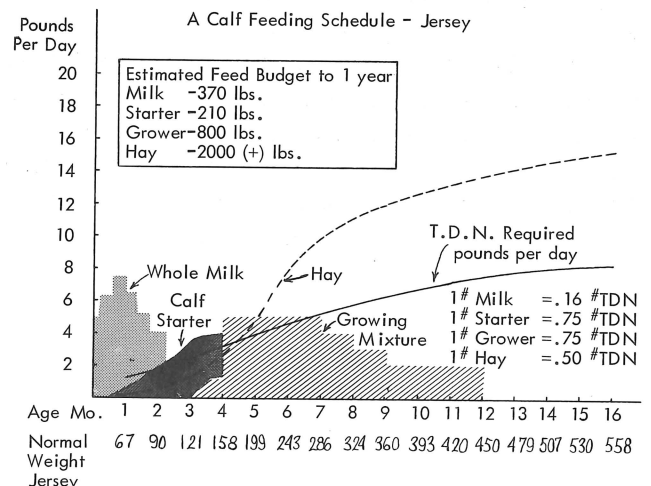
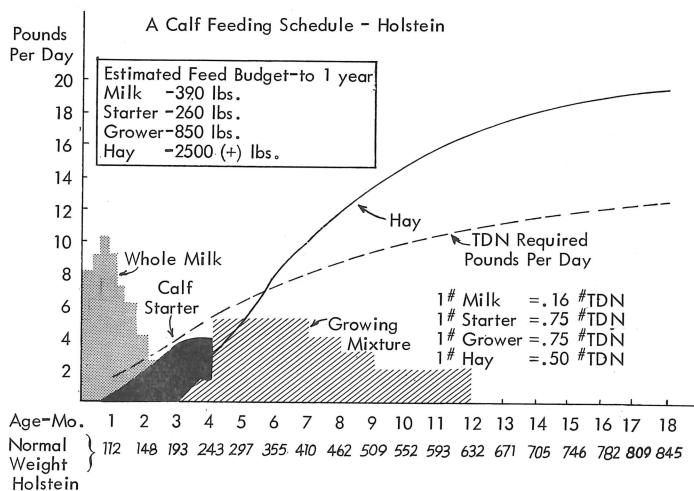
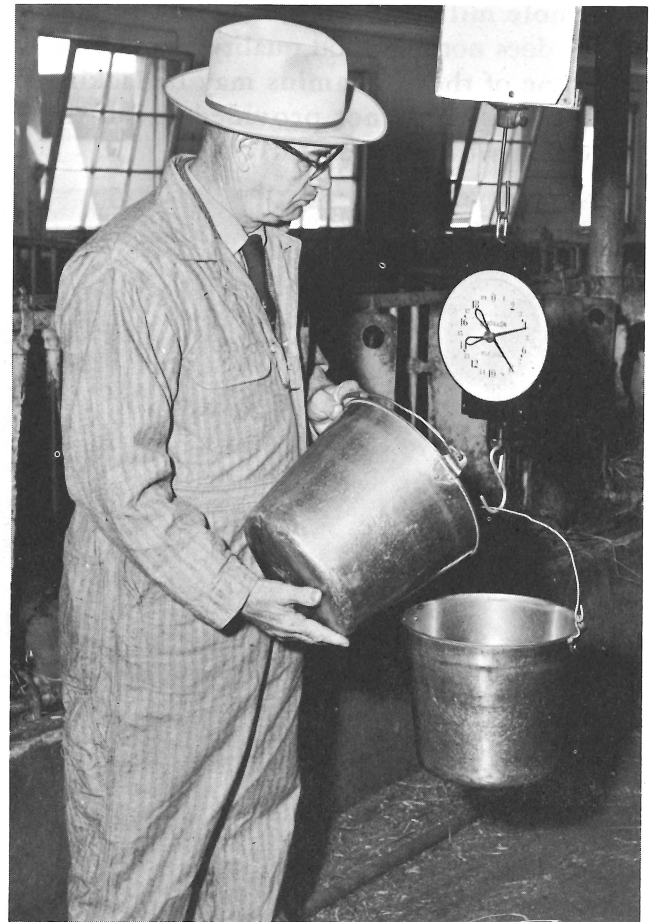
**should be eating grain well.*

This plan requires a total of 300 to 400 pounds of milk per calf. Calf starter should be placed before the calf at about two weeks of age. The calf should be encouraged to nibble a little of the starter. This may be done by placing a little in the bottom of the pail as the calf is finishing its milk or by rubbing a small handful on his muzzle and in his mouth just after it has finished the milk feeding. Be sure the feed is fresh each time.

Some calves learn to eat grain more quickly than others. When the milk ration is reduced, the calf should begin to eat the starter freely and be taking one pound or more per day at the end of 4 weeks and 3 to 4 pounds a day when milk is discontinued.

Beginning at one to two weeks of age, the calf should have choice quality fresh legume or mixed hay. When milk is discontinued, it should be taking some hay as well as grain. Thereafter, the amount of grain will not be increased much, but the amount of hay will increase steadily. Hay for calves should be of the best quality, early cut, bright, sun cured, and undamaged by weather. Fresh hay should be provided each day. For economy, much depends on getting the calf to eat good hay early in life. Hay will be the principal feed for the heifer as she grows older. At first, the small amount of hay consumed may not make a large contribution to the total nutrients needed. Even a small amount of hay contains needed vitamins and helps to develop the rumen so that, later on, large amounts of hay can be used.

At 4 months of age, gradually substitute a growing grain ration for the calf starter. Be sure the calf is eating 3 to 4 pounds of grain and at least that much good hay.



USING MILK REPLACERS

Milk replacers actually contain 50 to 90 percent of milk solids. They are designed to lower the cost of raising calves by replacing whole milk when the calf is 10 days to 2 weeks of age or even younger. These products are usually fed as a gruel. Manufacturer recommendations should be followed carefully. Most dairymen prefer to buy the milk replacers ready mixed. Calf starter is used much the same way as when whole milk is fed.

This plan produces calves that may be a little slower in getting a start and their coats may be a bit rougher. However, the calves usually are thrifty and, as they grow older, compare favorably with calves grown under other good plans.

The market value of milk saved, the cost of the replacer, the relative value of the calves, as well as the labor and time involved in feeding these rations, will determine whether or not a milk replacer will be used.

FEEDING SKIM MILK

You can raise good calves by substituting skim milk for whole milk at 3 to 4 weeks of age. If fresh liquid skim milk is not available, dried skim milk powder can be used if the price is favorable. Mixing 1 lb. of the powder with 9 pounds of warm water (1 gal.) gives the equivalent of liquid skim milk.

In the skim milk feeding method, the calf is started on whole milk as outlined in the paragraphs for limited whole milk method. At the end of 2 or 3 weeks, gradually substitute skim milk for whole milk so that by the end of a week the calf will be getting all skim milk. Using the weight and condition of the calf as a guide, increase the amount of skim milk until about 15 pounds are being fed daily at 8 to 12 weeks.

Skim milk feeding may be continued up to 6 months of age, or even longer, if the supply of skim milk is sufficient.

Calves on skim milk should have a grain supplement to take the place of the butterfat in whole milk. As long as the skim milk is fed, the grain may be a single farm grain, such as oats, or mixtures of corn, oats, and bran. Corn and oats may be fed unground to young calves as long as it does not pass through the calves whole.

Feed grain free choice up to 4 pounds per day. Provide best quality legume hay free choice. If the hay is not of excellent quality, use 10% of oil meal in the grain mixture.

When skim milk feeding is discontinued, the calf should be getting 3 to 4 pounds of grain and eating hay freely—6-8 pounds daily. At this time, a gradual change should be made to a growing ration (See page 14). The herd milking ration, containing 14-16% protein may be used if fiber content is reasonably low (under 8%).

OTHER METHODS

Calves may be raised on nurse cows when cows are available that are hard milkers or that don't fit into the milking operation. One or more calves may be raised on one cow depending on her production. Generally this is not an economical way to raise calves, but they do well by this method. Calves

may be weaned at 2 to 3 months of age and raised on calf starter and hay to 4 months, then put on a growing ration with plenty of good hay.

Other milk by-products, such as whey, sometimes are used in raising calves, but these are not recommended for beginners.

GRAIN RATIONS

1. *Calf Starters*— To be used where milk is limited:

	No. 1 (lbs.)	No. 2 (lbs.)
Ground Shelled		
Yellow Corn	300	170
Ground Oats	300	200
Wheat Bran	100	150
Linseed Oil Meal	100	100
Soybean Oil Meal	100	165
Skim milk or buttermilk powder	50	100
Salt With Trace minerals	10	5
Bone Meal	5	10
Irradiated Yeast	1/4	1/4
Alfalfa Meal	50	50*
Molasses	50	50*

*Optional. Advisable if hay is poor quality.

Feed starter "at will" up to 4 pounds daily until calf is 4 months of age. Then shift to a growing ration. Provide plenty of good hay and fresh water.

A commercial calf starter may be used in place of the above when it is more practical.

2. *Growing Ration*— For calves after 4 months of age when good quality legume hay is fed:

	Pounds
Ground Shelled Corn	400
Ground Oats	300
Wheat Bran	200
Soybean Oil Meal	100
Salt	10
Bone Meal	10

If hay is of poor quality, use 200 lbs. of soybean meal in the above mixture. The regular milking ration may be used as a growing ration.

PASTURE FOR CALVES

Pasture is one of the cheapest and best feeds that a dairyman can produce. However, young calves cannot eat enough pasture to supply all their needs. Also, calves are "choosy" about their pasture. If it is not good, they will eat little of it. It is a mistake to expect calves under 6 months to get a large part of their feed from pasture. After weaning, hay and grain should provide most of their nutrients.

Spring calves should be kept inside during the first summer. Although, a grassy lot with shade is desirable. However, avoid using lots that have been used by older cattle and which may be contaminated with worms and other parasites.

Fall calves will be ready for pasture the follow-

ing season. It is desirable to keep hay before the calves at least until they get used to the change. Grain should be continued until the calves are 12 months of age. Two to four pounds daily is usually sufficient if the pasture is of good quality. Keep a mineral mixture of salt and bone meal before the calves when on pasture.

It is well to provide a shelter for young calves the first year. A darkened shed where they can get away from the flies and sun is desirable.

Good water should be available at all times.

If pastures become short and unpalatable, it is especially important that hay be provided as a supplement.

SILAGE FOR CALVES

Silage may be used to replace part of the hay for calves after 6 months of age. It is usually not

best to replace all the hay with silage during the first year.

ANTIBIOTICS FOR CALVES

Experiments show that feeding antibiotics usually causes calves to grow faster in early life and to have less trouble with scours. Antibiotics are not a substitute, however, for proper sanitation, management, and plenty of good feed. Calves fed antibiotics may have better appetites, grow faster, and be larger, at 4 months. At two years, they may be no larger than calves that have had no antibiotics. The greatest response for calves making poor growth and for

those for which scouring is a problem is from birth to two months of age.

The antibiotics used most commonly are aureomycin and terramycin. The recommended amounts are 20 to 30 milligrams daily per 100 pounds of body weight added to the milk or milk replacer. Most commercial milk replacers and some calf starters contain antibiotics. Be sure to read the labels and follow directions when using commercial feeds and feed additives.

CHECKING YOUR HEIFER'S DEVELOPMENT

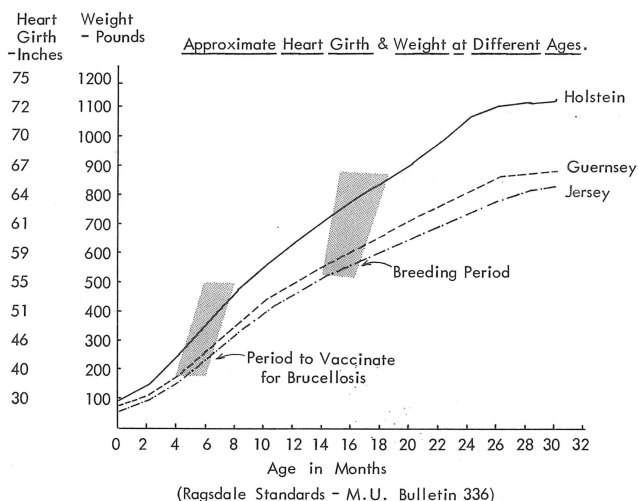
The accompanying chart is suggested as a guide to observing the development of your heifer. Know how your heifer compares in growth with the standard for the breed. If scales are not available, use a tape measure to check the heart girth and estimate the weight from it.

Don't neglect to vaccinate the heifer for brucellosis at 4 to 8 months of age. Breed the heifer at about these ages and weights:

Jersey	550 pounds	14 to 16 months
Guernsey	600 pounds	15 to 16 months
Holstein	800 pounds	15 to 18 months
Brown Swiss	800 pounds	15 to 18 months

If your heifer is not gaining weight normally or appears to be unthrifty, increase or improve the quality of the ration so she will gain faster. It is important, however, to grow the heifer without getting her too fat. This calls for a good quality roughage and pasture and some grain, but not so much of fattening grains such as corn, that she will get fat. Oats and bran along with good pasture or legume hay, with salt, and bone meal are good growing feeds. Provide plenty of water in all cases.

If the heifer is underweight, breeding may be delayed a month, or two; however, it is preferable to grow them at a normal rate so they can be bred at the normal time.



MANAGING

Identification and Registration

Your calf should be positively identified soon after birth and before there is any chance of it becoming mixed up with other calves. Identification is required for registration.

Solid colored animals such as Jersey, Brown Swiss, and solid colored Guernsey, are required to have a tattoo in the ear for registration. This tattoo is included on the registration application. Broken colored animals such as Holsteins and most Guernseys may be identified by a drawing or picture on or attached to the registration certificate.

You should get in the habit of identifying animals while they are very young. The cost of registration is less if done before the calf is 6 months of age. Be sure that a record is made of the identifica-

tion at once. Record name, birth date, sire and dam along with the calf's tattoo. Preferably, fill out the application for registration at the same time.

Ear tags may be used to identify grade animals or for temporary identification. Tags with a coded number may be secured from your supervisor if your herd is on DHIA test, from the artificial breeding technician when he services your herd or from your veterinarian when he vaccinates your calf for brucellosis. Tags from these sources are recommended. The 9-digit numbers will not be repeated anywhere in the United States. Be sure to record all ear tag numbers at once.

For temporary identification, neck chains with numbers may be used until more permanent identification can be made.

Tattooing

You will need to follow a careful procedure to tattoo your calf so that it will be a permanent life time identification. These steps are essential.

1. Secure a tattoo outfit which will include a pliers or punch to carry the letters and numbers, letters and numbers you will need, tattooing ink and some solution to clean the ear, such as alcohol or other wax solvent.

2. Set up the tattooing tool with the desired letter or numbers. Always check it on a piece of cardboard to see that you have the letters and numbers inserted correctly.

3. Hold or restrain the calf so it can't jerk away.

4. Clean the area of the ear to be tattooed. This should be the middle portion of the ear (usually right ear for identification) between the ribs of the ear where it will not be obscured by hair. Use alcohol or other solvent to remove dirt and wax which may get into the perforations and prevent the ink from penetrating.

5. Locate the tattooing instrument carefully and make a firm impression with the needles on the inside of the ear.





6. Apply tattooing ink and rub it well into the impression made by the needles. Check to see if the number can be easily read.

If properly done the resulting tattoo should be permanent for the lifetime of the animal. Be sure to record the identification number in your records and on the application for registration. Forms for registering animals with instructions may be secured from the breed association or sometimes from a neighboring breeder.



Pictures or Drawings

A good way to identify broken colored animals is to use a small blackboard on which is plainly written the name of the calf, its birth date, and the registration number of the sire and dam. Hang this blackboard on the side of the barn, stand the calf under it and take a picture including the calf and black-

board. Take a second picture of the other side of the calf. This gives a good record for registration and your herd book.

Where drawing of color markings are required for registration these can be made directly on the registration application.

DEHORNING CALVES EARLY

Horns on dairy cattle can be a nuisance and are responsible for many injuries to bodies and udders. There is no longer any discrimination against hornless cattle in show rings and sales. If done early, dehorning is a simple task and, with practice, a neat clean job can be done with little discomfort to the animal.

Caustic Potash

Sticks or paste are economical for dehorning and are readily available. Plan to do the dehorning as soon as you can feel the horn buttons under the skin. Usually this will be at 4 to 10 days of age.

Clip the hair over and around the horn buttons as closely as possible.

Place a ring of vaseline or other grease around the button leaving an area about the size of a quarter centered around the button. This prevents the caustic from spreading and running down the calf's face.

Wrap the caustic stick in paper to protect the fingers.

Moisten the caustic stick and rub it over and around the base of the horn button until the outer skin begins to soften. Don't use too much. It is important to apply the caustic to a circular area around the base of the horn button. The button itself does not have to be completely removed in the operation.

Caution

Caustic potash is similar to ordinary lye and is very corrosive to skin. Keep it in a tightly stoppered bottle and store where children can not get to it. It is also sold as a paste which is applied with a small paddle according to directions.



Electric Dehorners

Electric dehorners are becoming more popular with dairymen. These are similar to a large soldering iron with hollow tips or various sizes to fit over

the horn button. Follow directions supplied by the manufacturer. The electric dehorner can be used at 2 weeks of age up to 2 months, but preferably under 1 month.

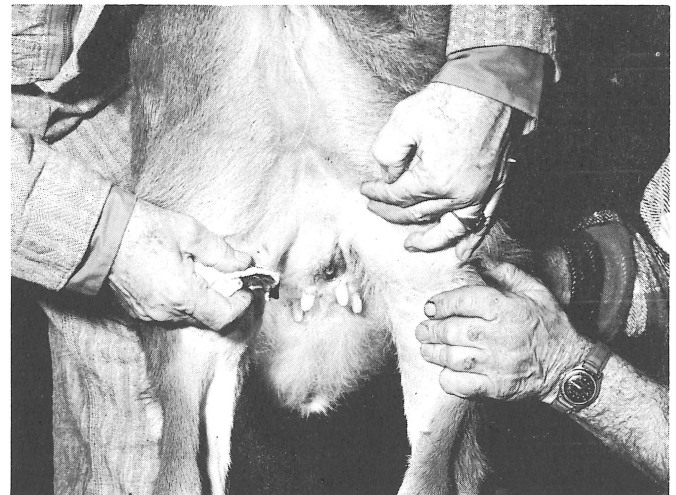
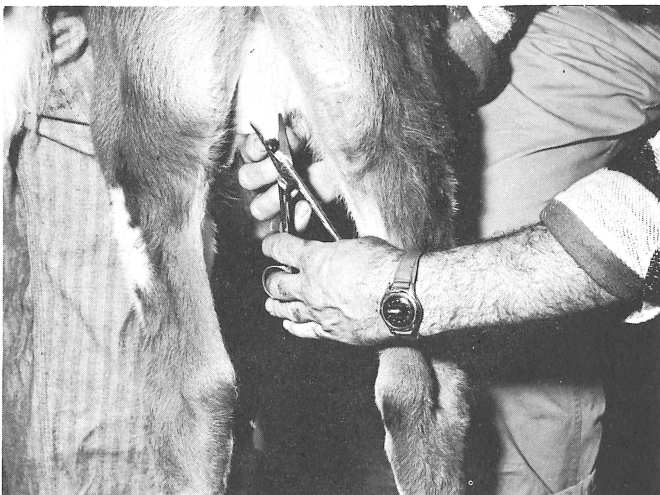
REMOVING UNSIGHTLY "EXTRA" TEATS

Dairy heifers often have extra rudimentary teats which can be a nuisance if not removed before the heifer comes into production. This is easily done when the heifer is 1 to 4 months of age, while still easy to handle.

Disinfect the area with iodine or other reliable disinfectant before and after the operation. Use an ordinary sharp shears, an emasculator or a hand pruning shears of the type where one sharp blade makes contact against a metal block.

Restrain the calf so that the udder is accessible. Mark the extra teat to be removed to be sure that you do not cut off the wrong teat. Draw the teat down and make the cut cleanly at the line where the teat joins the udder. There is seldom any bleeding. Disinfect the cut.

Sometimes an extra teat may be grown together with one of the regular ones at the base, or so close to it that removal is difficult. Such cases are best handled by a veterinarian.



VACCINATION

Your dairy heifer should be vaccinated for brucellosis at 4 to 8 months of age, preferably at about 6 months. Earlier vaccination may not result in full and lasting immunity, while later vaccination may result in a life long positive blood test. Calfhood vaccination for brucellosis is part of the program to eliminate this costly disease. Calfhood vaccination along with regular testing and removal of reactors from the herds can accomplish this. Both are needed for rapid progress. Vaccination helps the heifer resist exposure to the brucella organisms, while slaughter of reactors removes most of the chances of spreading infection to cattle and to hu-

mans. Report your calf to the veterinarian for vaccination at 4 months. Give him plenty of time to do the job before the 8-month deadline.

Vaccination for black leg and malignant edema is not expensive and is advisable, particularly if there have been any cases of these diseases on the farm or in the neighborhood. These organisms live in the soil for a long time.

Vaccination for hemorrhagic septicemia, also called shipping fever, may be advisable if cattle are to be moved considerable distances and when on show circuit. Consult your veterinarians in plenty of time.

CARE OF THE FEET

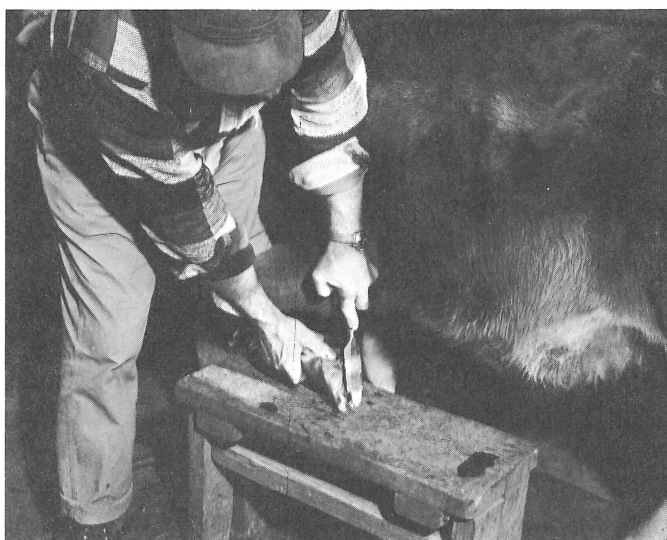
When calves are confined to pens or stanchions, their feet may grow faster than they are worn off. The toes may turn up and the walls of the hoof may grow below the sole of the foot and turn under. This is likely to cause the calf to walk improperly and may result in weak pasterns and crooked legs.

Examine the feet of your calf occasionally. If they are grown out abnormally, trim the toes back to normal shape with a wood chisel or hoof clippers. Use a knife or wood rasp to level the bottom

of the hoof. Before starting to trim the foot scrape away all dirt and manure from the bottom of the hoof so you can see where it needs to be trimmed.

Ordinarily, only the toes and the wall of the hoof that extends below the sole of the hoof needs to be trimmed. Avoid cutting or injuring the soft bulb of the hoof. If the excess toe and hoof edge is trimmed off, the foot usually returns to normal. If the toes are extremely long, it may be advisable to trim off part of them, then complete the job a week or two later. Be careful not to cut deep enough to cause bleeding.





DISEASES AND ABNORMALITIES

Scours

Scours in calves may be of two types. They may be a digestive disturbance due to overfeeding, irregular feeding, drinking milk too fast, lack of proper sanitation, change in temperature of the milk, etc. They may be brought on by cold, damp, floors; drafts; or abrupt changes in feed.

The calf may be listless and be constipated before the scouring starts. Reduce the feed to one half the usual amount and give a suitable purgative such as 4 oz. of olive oil in 1 pint of warm milk. In each small feeding use one teaspoonful of the following mixture: Bismuth Subnitrate 1 part; sodium bicarbonate 3 parts; and salol 1 part, until the calf improves.

White scours are caused by a virus. They often start at birth or shortly after. Infection may be through the navel cord or through the digestive system. They are usually fatal within 3 or 4 days. Prevention is the best cure for white scours. Important points are:

- Clean calving quarters;*
- Clean cow's udder before calf nurses;*
- Disinfect navel cord at birth;*
- See that calf gets colostrum promptly;*
- Isolate sick calves;*
- Consult your veterinarian.*

Pneumonia

Pneumonia may follow scours if they are not promptly corrected in the early stages. Drafts, and damp, poorly ventilated quarters may bring on the disease. Symptoms are poor appetite, constipation, coughing, rapid breathing, high temperature (105-106°). Pneumonia is often fatal.

Put the calf in dry, draft free, quarters with plenty of fresh dry bedding. Blanket the calf. Feed moderately and give a purgative if necessary. Massage or rub the calf vigorously several times a day. Consult your veterinarian regarding the use of sulfonamides and antibiotics.

Ringworm

Ringworm is caused by a fungus obtained by contact with another infected animal, a blanket, curry comb, etc., which is infected. It shows up as circular, crusted, or scabby, hairless, areas which increase in size, usually about the head, neck or shoulders.

Isolate infected animals. Scrub off infected areas with soap and water. When dry, paint with tincture of iodine or apply iodine ointment daily to the infected spots. Consult your veterinarian if infection does not improve.

External Parasites

Lice may infect calves, particularly in winter when they are closely housed. They cause irritation and unthrifty appearance. Hair may be rubbed off in spots. Apply dust containing 1.5% rotenone. Rub it into the hair. Methoxychlor dust may also be used. Two treatments two weeks apart are recommended.

Internal Parasites

Infestation with stomach worms and lung worms may result where calves are kept in pens and in pastures that have been used for older cattle for a long time. Internal parasites cause unthriftiness,

rough coats, and poor growth.

Keep the calves in clean pens or pasture lots. If parasites are suspected, consult your veterinarian for treatment.

Warts

Warts occur commonly on calves during the summer and autumn on the skin of the head, neck or other parts of the body. They are contagious. Daily application of castor oil when the calves are small may give good results. In some cases, a silk thread may be tied around the base of the wart. This will cause it to drop off. Isolate badly infected animals. In severe infections, veterinarians may recommend vaccination.

Poisoning

Lead poisoning is common in calves if they are permitted to lick or eat paint from painted walls or equipment. Be particularly careful to allow no old paint buckets or brushes to remain where calves may reach them. If paint containing lead is consumed in any appreciable quantities, the animals usually die.

Fertilizer, particularly that containing nitrates, may cause fatal poisoning in cattle. Avoid storing fertilizer where cattle may have access to it. Old fertilizer sacks must not be allowed where cattle can find them.

WHAT DOES IT COST TO RAISE A CALF?

It is difficult to estimate accurately the cost of raising a calf. This is one good reason why you should keep a careful record to know what your costs are likely to be, under your conditions. Some factors that effect costs will be:

1. The price of feeds
2. The feeding plan used
3. Feeds home grown or purchased
4. Labor saving equipment
5. Cost of any hired labor

6. Disease control
7. Veterinary fees
8. The extent to which you are able to use pasture to replace hay for calves over 6 months
9. How good a herdsman and manager you are
10. Overhead costs and interest taxes, depreciation, etc.

The following, Table 1, gives a rough estimate of the amount and the cost of feed required during 6-month periods. It assumes one feeding plan: whole milk, starter, grower, and roughage, using one set of prices. Roughage is figured as hay, part of which can be replaced by silage and pasture for calves over 6 months.

Feed, of course, is the largest item. It makes up about 70% of the total cost of raising a heifer. Other important items are:

Labor—\$25 to \$40

Veterinary—\$5 to \$8

Breeding fees—\$6 to \$8

Depreciation and Repairs—\$2 to \$4

Taxes and insurance—\$1 to \$2

Miscellaneous—\$5 to \$10

Total—\$44 to \$72

These are rough estimates of the cost of these items up to freshening time. For the first 15 months or up through breeding time, about three-fourths of these costs, other than cost of feed, will be incurred.

TABLE 1-ESTIMATED AMOUNTS OF FEED REQUIRED FOR RAISING HEIFERS

Feed	Amount Needed	Price Assumed	Cost	Total Digestible Nutrients Furnished (approx.)
<u>1st 6 months</u>				
Milk	400 lb.	\$ 4.00	\$ 16.00	65
Starter	250 lb.	\$ 4.00	\$ 10.00	170
Grower	200 lb.	\$ 2.50	\$ 5.00	150
Hay	400 lb.	\$25.00	\$ 5.00	200
6 months Total	--	--	\$ 36.00	585
<u>2nd 6 months</u>				
Grower	500 lb.	\$ 2.50	\$ 12.50	375
Hay	1500 lb.	\$25.00	\$ 18.75	750
6 months Total	--	--	\$ 31.25	1125
12 months Total	--	--	\$ 67.25	1710
<u>3rd 6 months</u>				
Hay	3000 lb.	\$25.00	\$ 37.50	1500
6 months Total	--	--	\$ 37.50	1500
<u>4th 6 months</u>				
Hay	4000 lb.	\$25.00	\$ 50.00	2000
Grower or Milking ration	100 lb.	\$ 2.50	\$ 2.50	75
6 months Total	--	--	\$ 52.50	2075
12 months Total	--	--	\$ 90.00	3575
24 months Total	--	--	\$157.25	5285 pounds
<u>Total amounts required to 24 months--</u>				
	Milk--	400 pounds		
	Starter--	250 pounds		
	Grower--	800 pounds		
	Hay--	8900 pounds		

CONTENTS

Selecting a Breed	2
Selecting a Calf	6
A New Born Calf	8
Housing	9
Feeding	9
Limited Whole Milk	11
Using Milk Replacers	13
Feeding Skim Milk	13
Other Methods	13
Grain Rations	14
Pasture for Calves	14
Silage for Calves	14
Antibiotics for Calves	15
Checking Your Heifer's Development	15
Managing	16
Dehorning Calves Early	18
Removing Unsightly "Extra" Teats	19
Vaccination	20
Care of the Feet	20
Diseases and Abnormalities	21
What Does it Cost to Raise a Calf?	22



Issued in furtherance of cooperative extension work, acts of May 8 and June 30, 1914, in cooperation with the United States Department of Agriculture. C. B. Ratchford, Vice-President for Extension, Cooperative Extension Service, University of Missouri, Columbia, Mo. 65201.