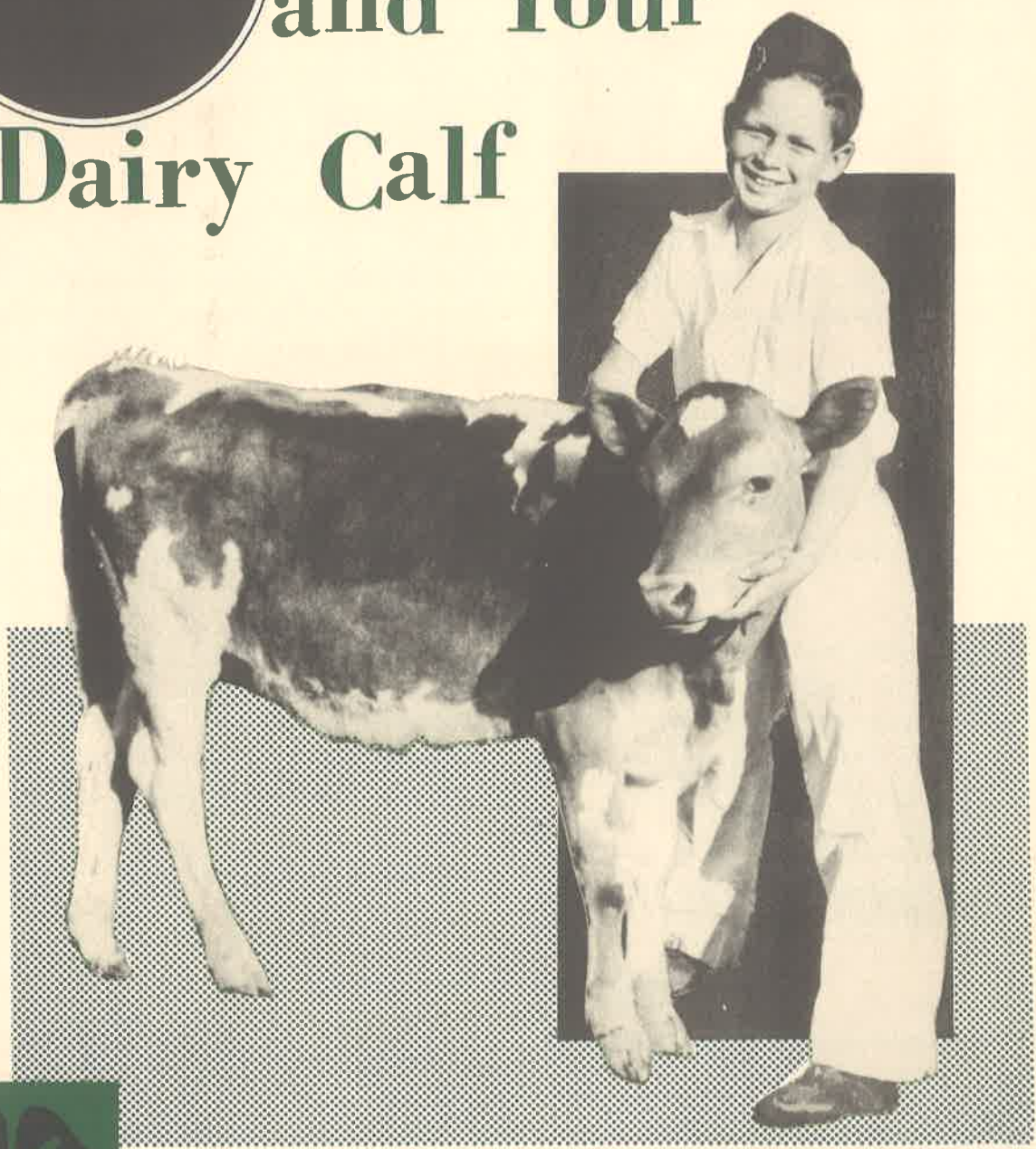




# and Your Dairy Calf



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**UNIVERSITY OF CALIFORNIA**  
AGRICULTURAL EXTENSION SERVICE

## **Do You Know**

### **How to Buy a Good Dairy Calf?**

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Do you resemble your mother and father? Calves do theirs. You can't expect a calf to grow up to be a good cow unless its mother is a good one. You want your calf to be a good producer. Then get one whose mother produced over 400 pounds of butterfat in one year. Its father should be registered. Did you know that 4-H'ers call a calf's mother the DAM, and the father the SIRE?

### **Which Breed of Dairy Cattle Do You Like?**

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Choose the one you like best. There are good ones in all breeds. As your 4-H Club dairy calf project develops into a herd, you may find it an advantage to have the breed that is popular in your neighborhood.

Is your father a dairyman? If he is, you may want the same breed he keeps. Maybe you can make a deal with him later to use his bull.

### **Do You Want a Grade or Purebred Calf?**

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A purebred, you know, is an animal whose sire and dam both have registration papers. A grade is one whose sire is purebred, but the dam is not. You can use either one in the 4-H Club. A grade will cost you less money than

### **Is This Calf a Good Buy?**

Did its dam produce over 350 pounds of butterfat in a year? Is its sire a purebred bull? Is it healthy? If it has bright eyes, sleek hair and a clean tail it probably is healthy.

Don't pay more than you have to, but remember, a good calf is worth more than a poor one.

A heifer calf with a twin brother is not a good buy. This kind of calf is called free-martin. Most of them will never have calves.

### **Does It Pay to Go to This Much Trouble?**

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Yes it does. Before your calf gets to be a cow, you will spend more money for feed than you spent for the calf.

She has to pay you back in milk. Some cows will not. Good ones produce well and make money.

Make certain you get your money's worth when you buy.

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a purebred. On the other hand, if you want to show at fairs a good purebred will be better.

Many club members start with grades and go into purebreds later. Whichever way you decide, get a good one.

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## HOW ARE YOU DOING?

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You are in business when you buy a dairy calf. It will cost money. More money to feed it. Time to take care of it, too.

Save your time and money by knowing your business.

Find out how you are doing.

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## DO YOU KNOW HOW TO BUY?

Check true sentences "Yes."

Check untrue sentences "No."

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| 1. A calf takes after its sire and dam.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The dam of a calf is the father.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The dam of a calf is the mother.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The sire of a calf is the father.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. A 4-H Club member should pick a calf from the breed of cattle he or she likes best. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. A 4-H Club project calf must be purebred.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A calf is a good buy if it is from a grade bull.                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. It pays to buy the cheapest calf you can find.                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A freemartin is a good buy.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The calf costs more than the feed needed to raise it.                              | <input type="checkbox"/> | <input type="checkbox"/> |

The correct answers are on the back of this sheet.

If you answered them all right you're on your way. If not, find the answers in the leaflet and try again.

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# Know Your Breeds

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**AYRSHIRE** A dairy breed developed in Scotland.

**Color:** Red of any shade, mahogany, brown, with white, or white alone, each color clearly defined.

**Size:** Cows—1150 pounds; Bulls—1800 pounds.

**Milk:** Contains about 4 per cent butterfat, very white in color.

**Horns:** Long and turned gracefully up and outward.

Ayrshires are noted for even udders and style.



**BROWN SWISS** A breed developed in Switzerland and one of the oldest breeds of cattle known.

**Color:** Light or dark brown or gray.

**Size:** Cows—1400 pounds; Bulls—1900 pounds.

**Milk:** Contains about 4 per cent butterfat.

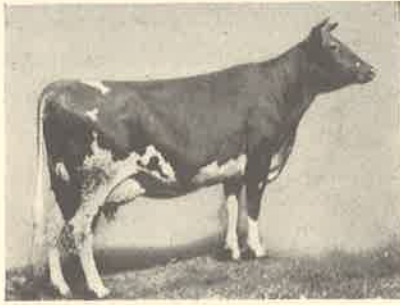
**Horns:** Inclining forward and slightly up.

They are noted for ruggedness and long life.

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## ANSWERS TO THE QUIZ

1. Yes 2. No 3. Yes 4. Yes 5. Yes  
6. No 7. No 8. No 9. No 10. No



**GUERNSEY** A dairy breed developed on the Guernsey Island which is in the English Channel near France.

**Color:** Fawn and white with yellow skin and clear or buff muzzle.

**Size:** Cows—1100 pounds; Bulls—1700 pounds.

**Milk:** Very yellow in color and contains about 5 per cent butterfat.

**Horns:** Medium size and amber color.

Guernseys are noted for gentle disposition.

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**HOLSTEIN** A dairy breed developed in Holland.

**Color:** Black and white.

**Size:** Cows—1500 pounds; Bulls—2000 pounds.

**Milk:** Contains about 3.5 per cent butterfat.

**Horns:** Inclining forward, incurving.

Holsteins are noted for large size and for producing large quantities of milk.



**JERSEY** A dairy breed developed on the Island of Jersey, which is near the Guernsey Island.

**Color:** Fawn, cream, mouse gray, brown and black, with or without white markings. Muzzles and tongues usually black.

**Size:** Cows—1000 pounds; Bulls—1500 pounds.

**Milk:** Yellow in color and contains about 5.3 per cent butterfat.

Jersey cattle are noted for refinement and rich milk. They are the smallest of the dairy breeds.

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**MILKING SHORTHORNS** A dual purpose breed developed in England, sometimes called Durhams.

**Color:** Red, white, either solid or mixed or roan.

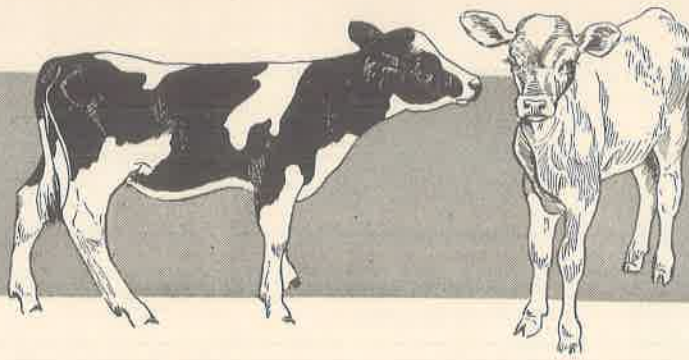
**Size:** Cows—1500 pounds; Bulls—2000 pounds.

**Milk:** Contains about 4 per cent butterfat.

**Horns:** Grow out and down.

Milking shorthorns are noted for producing both meat and milk.





## FEED YOUR DAIRY CALF *the 4-H Way*

Your dairy heifer calf needs your help if it is to become a good cow. Give it high quality feed and the best of care and you will do your part in developing a valuable milk producer.

### Give Your Calf a Good Start

Your calf needs its mother's milk the first three days. Her milk at this time is very yellow and sticky. It is called *colostrum*. This milk is rich in vitamin A and other things that help the calf make a good start. The sooner your calf receives this colostrum, the better. Calves that do not get colostrum are hard to raise.

Soon after the calf is born it will usually nurse. If not, you can help by standing it up and putting one of its mother's teats in its mouth.

Some dairymen take a calf away from its mother after it has nursed one time. If you do this, the calf learns to drink from a bucket easier. Other dairymen may leave it with its mother for two or three days. Do it either way, but be sure your calf gets the colostrum milk for the first three days.

### Feed the Right Amount

Too much milk kills more calves than too little. You don't want to starve your calf but don't feed it too much milk, either. If you have scales, use them to make certain you give the right amount. If you don't have scales, a measuring cup will do. A cup of milk weighs about  $\frac{1}{2}$  pound.

If your calf is a Jersey or Guernsey, feed it 4 to 6 pounds a day at the start. This would be 8 to 12 cups. Ayrshires, Brown Swiss and Holsteins may use up to 8 pounds.

Your calf may not want this much. If it doesn't, do not try to force it to eat more than it wishes. However, don't give it any more than this amount even if it wants



more. Good dairymen like for their calves to be slightly hungry after each meal. As your calf grows, increase the amount of milk, a little at a time. It should have about one pound of milk for every 10 pounds of body weight.

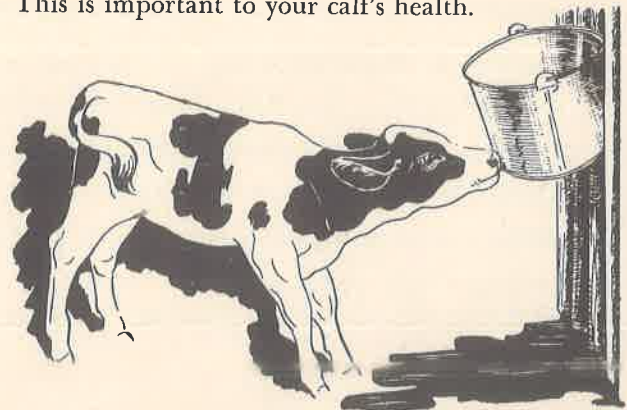
Watch out for "scours"! Diarrhea in calves is called "scours." If your calf develops this condition, you may have given it too much to eat. If this happens, reduce the amount of milk you are feeding by half.

How many meals should your calf have each day? Most calves get their milk twice a day, but some dairymen believe they do better when fed three times a day. Do it either way, but feed the right total daily amount.

The temperature of the milk is important, too. Cold milk can cause scours. To avoid feeding your calf cold milk, do one of the following:

- Feed it just after milking, or
- Warm the milk, using a thermometer to determine when the temperature reaches 100° F., and feed the milk to your calf as soon as possible.

Feed milk to your calf in either a shallow feeding pail or a nipple bucket. Whichever you use, be sure to wash and sterilize it carefully after every feeding. This is important to your calf's health.



## Two Weeks to Six Months

After your calf has made a good start on whole milk, you then can think about using cheaper feed. Most calves are ready for this change at two or three weeks of age. If for some reason your calf is not doing well, give it whole milk another week.

There are several ways to feed calves which are from two weeks to six months old. Some dairymen continue to use whole milk; others use skim milk. Another way is to feed a calf meal. You either can buy a ready-prepared calf meal or mix it yourself. If you decide to buy the ready-prepared meal, be sure to follow the directions that come with it.

Would you like to make your own? Here is a mixture that has raised many fine calves:

- 100 lbs. dried skim milk
- 100 lbs. rolled barley
- 100 lbs. rolled oats
- 100 lbs. wheat bran
- 50 lbs. linseed meal
- 10 lbs. steamed bone meal
- 5 lbs. iodized salt

Start your calf on this meal as soon as it leaves its mother, usually when it is two or three days old. Rub a little on its mouth after it has had its milk. Sometimes, putting a pinch in its mouth helps give it the idea. After a day or two, put a small handful in the bottom of the bucket after the milk is gone. Never increase the amount more than a small handful over what was given the day before. By the time your calf is four months old it should be eating  $3\frac{1}{2}$  to 5 pounds a day. Continue this amount until it is at least six months of age.

As your calf begins to eat meal, you gradually can reduce the milk. Some dairymen encourage calves to take all the meal they will eat, and they stop feeding liquid milk by the time the calves are a month old.

Others prefer to continue the milk feeding until calves are about two or three months old. If you decide to follow this system you may want to use skim milk in place of whole milk. If you don't have skim milk on your farm, you may buy dried skim milk. Mix one pound with nine pounds of warm water (100° F.). One pound of this reconstituted skim milk can replace one pound of whole milk.

When skim milk is used add one teaspoon of cod liver oil each feeding.

## Hay for Calves

In selecting hay for your calf, look for green color, fine stems, and many leaves. Either alfalfa, oats and vetch, or mixed pasture hay can be used. It's more important to have good hay than to worry too much about the kind. However, many calf raisers prefer alfalfa.

Give your calf a little hay each day, starting when the calf is taken from its mother. Take away what it doesn't eat and give it new hay every day. After it starts to eat, increase the amount. Don't be afraid of wasting hay on young calves. Allow them to pick out the best part, then give what they leave to older cattle. It will pay to give your calf all the hay it will eat, but be sure it has enough of the other feeds too.

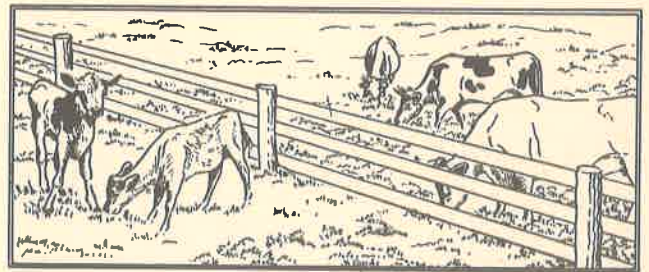
## Water

Have water available for your calf all the time after it leaves its mother. Be sure to rinse the water bucket and give your calf fresh water every day.

## Pasture

A small pasture is a good place for your calf to be after it is three or four months old. Calves should have their own pasture. Having young dairy calves in a pasture with older cattle isn't a good practice.

Pasture is often said to be the perfect feed for cattle. This is not true for young calves. They need other feed on which to grow and develop before they are ready for much grass. So, in addition, provide your animal all the hay and calf meal it needs.



## Minerals

Hay, grain, pasture and other feeds all contain minerals. These feeds along with salt and steamed bone meal, usually furnish all the minerals that dairy cattle need. However, there are places where others may be needed. Ask your farm advisor. He will know about this.

## Six Months to One Year

By the time your heifer is six months old it is ready for a cheaper grain mixture. It will then do well on the grain mixture your dad feeds his cows.

Perhaps you would like to mix your own. If you are feeding alfalfa hay or have your calf on irrigated pasture use:

- 2 parts ground barley
- 2 parts oats
- 2 parts wheat bran
- 1 part linseed meal

Add 1 pound of salt and one pound of steamed bone meal to 100 pounds of feed.

With mixed hay, such as oats and vetch, or hay cut from irrigated pasture, for a grain mixture use 2 parts of barley, 2 of oats, 2 of bran, and 2 of linseed meal.

For grain hay, use equal parts of ground barley, oats, and wheat bran, plus two parts linseed meal.

Did you know that dairymen often call grain mixtures "concentrates"? Whatever concentrate you feed, be sure to give your heifer enough to keep it growing well. Two or three pounds a day usually are enough.

Good pasture is the cheapest feed for your calf at this age—but don't forget to give it all the good hay it will eat, too.

## One Year to Freshening

From the time your heifer is one year old until three months before freshening, it will grow well on pasture and hay. Unless you are short of these feeds, no concentrate should be needed.

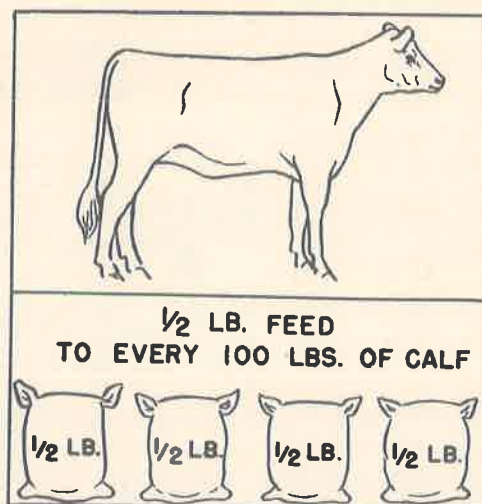
Three months before she is due to have her calf, you can start feeding her grain again. This will help to keep her growing while she is developing her calf.

Start feeding the grain mixture at the rate of about two pounds a day. When she eats all of this amount, she is ready for a little more. Add  $\frac{1}{4}$  pound per day until she is getting the amount you want her to have. A good rule is to feed one half pound for every 100 pounds she weighs. For example, a Holstein weighing 1000 pounds would get five pounds of grain.

A good grain mixture for a heifer heavy with calf is equal parts of bran, oats, and beet pulp. If she should quit eating do not feed concentrates for a day. Then start again at the two pounds a day rate. Increase the amount a little each day.

A few days before your heifer freshens, her udder will start to swell and get tight. When this happens, quit feeding the grain.

Maybe the heifer you have raised will present you with a heifer calf. If she does, now you know how to raise it.





# Guide for Feeding Dairy Calves

Age of Calf	Feed to Use	Amount Each Day	
		Ayrshire Brown Swiss Holstein	Jersey Guernsey
Birth-3 days	Colostrum.....	All calf wants	
3 days-2 weeks	Whole Milk.....	12-15 cups	9-12 cups
		(Divide amount by 2, if feeding twice a day. Divide by 3, if feeding 3 times a day.)	
2 weeks-6 months	Skim Milk, until calf is 2 months of age.....	1 pound for each 10 pounds' body weight of calf. Divide amount by 2 and feed twice a day.	
	Calf meal <sup>(1)</sup> ..... plus	All calf will eat—up to 5 pounds a day.	
	Hay, salt, steamed bone meal and water.....	All calf will eat.	
or			
2 weeks-6 months	Calf Meal..... plus	All calf will eat—up to 5 pounds a day.	
	Hay, salt, steamed bone meal and water.....	All calf will eat.	
6 months- year	Pasture, hay, salt, steamed bone meal and water..... plus	All heifer will eat.	
	Concentrate <sup>(2)</sup> .....	2½-3 pounds a day	2-2½ pounds a day
1 year-3 months before freshening	Pasture, hay, salt, steamed bone meal and water.....	All heifer will eat.	
3 months before freshening to near freshening	Pasture, hay, salt, steamed bone meal and water..... plus	All heifer will eat.	
	Concentrate..... Equal parts— wheat bran ground oats dried beet pulp	2-3 pounds each day.	

<sup>(1)</sup>Calf Meal Mix 100 lbs. Dried skim milk  
100 lbs. Rolled barley  
100 lbs. Rolled oats  
100 lbs. Wheat bran  
50 lbs. Linseed meal  
10 lbs. Steamed bone meal  
5 lbs. Iodized salt

<sup>(2)</sup>Concentrate Mix 2 parts ground barley  
2 parts oats  
2 parts wheat bran  
1 part linseed meal

# Special Feeding Tips

## **When Buying Calves**

When buying a calf started by someone else be sure to ask how much and what kind of feed it has been getting. You will have less trouble if you use the same kind of feed for a while. If you make a change, do it gradually.

## **In Moving Baby Calves**

When moving young calves reduce the amount of milk and calf meal by one half the last feed before leaving. This amount should be continued during the trip. After the trip the feed can be gradually increased to the normal amount.

## **In Moving Older Calves**

When calves are to be moved reduce the amount of milk or concentrates they receive by one half during the trip. Hay should be fed as usual.

## **When Feeding Bull Calves**

Feed a bull calf just as you would a heifer. The only difference is that bulls are larger for their age and need a little more feed.

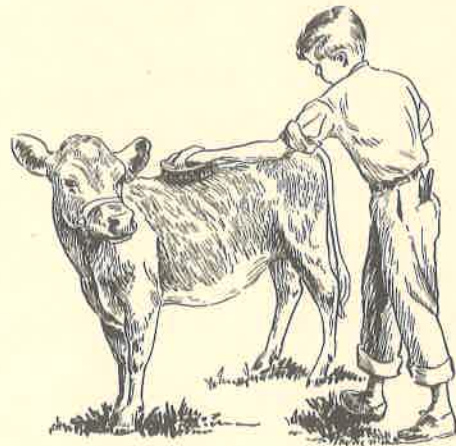


## *In Starting*

You and your calf are going to the fair! Both of you will need to get ready. You'll be off to a good start if you begin to fit your calf at least a month before the show. However, this is only the finishing touch. Proper feeding and the right kind of care from birth are necessary if the calf is to do well in the show ring. Remember that your job is to help your animal make as good a showing as possible.

## *Care of the Hair*

Some warm sunny day about a month before the show, give your calf a bath. Use plenty of soap to remove the dirt from the hair. Rinse the soap away with clear water. Brush the hair the way you want it to go, while it still is a little damp. Brush it down from the center of the back. Then, blanket your calf and put it in a barn or shed and provide plenty of straw bedding to keep it clean.



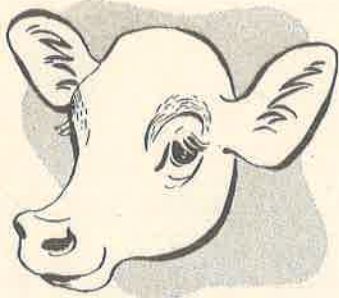
Brushing your calf every day will pay off on show day. After brushing, rub the hide gently with your hands. If your calf has a lot of long, dead hair you can take this off by brushing with sand paper placed over a block of wood.



If white spots on the calf get stained with manure, wash these away as soon as possible. You may have to do this several times to remove the stain. Wash the tail switch often, especially if it is white.

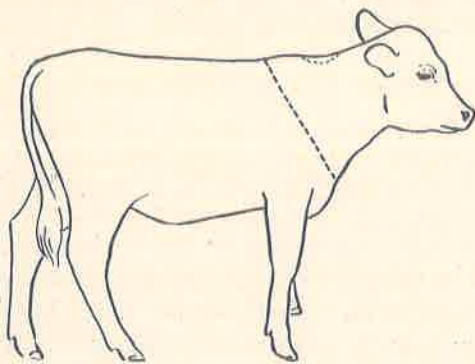
## Clipping

Some clipping improves the appearance. However, it is unnecessary to clip the entire body if enough time has been allowed for fitting. The time to clip the hair on your calf is about a week ahead of the show. Remember, use the hair to make your calf look its best, just as veteran showmen do.



As an example, Jerseys and Guernseys should have "dish faced" heads. If your animal belongs to one of these breeds, but has a flat face, it can be improved by leaving the hair around the eyes. Clip clean between the eyes. On other breeds trim all the hair from the face.

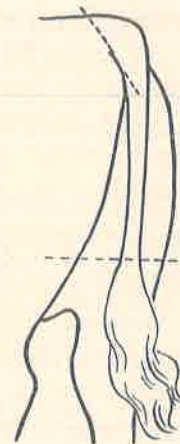
As another example, a good dairy animal should have a wide muzzle. Emphasize this by leaving the hair about the mouth.



The neck should be clipped back to an imaginary line running from the point of the shoulder to the withers. If your calf happens to be U-necked, leave the hair in the notch to fill it out.

Do not clip the belly of dairy heifers. Leaving this hair gives the appearance of greater depth of body.

Clip the hair on the tail from the top of the switch to the tail head. This will help the tail to appear long and thin.



## Horns and Feet

4-H Club cattle do not need horns to win in the show ring. Good herd management suggests taking them off. The dehorning job should be neat and clean.

However, some persons prefer to leave horns on show cattle. If you decide to leave the horns you will want to know how to polish them. Remove scratches on the horns and feet by taking off the surface with No. 1½ emery paper. First, tear the paper into strips ½-inch wide. Then pull these across the horn or hoof, like a shoe polishing cloth. Follow this with fine sandpaper. Don't take off too much at one time. If blood starts to show, stop.

If the hoofs are long, trim them back with a pair of hoof clippers. Smooth the hoofs with a *light* cutting wood rasp. Take off enough so your calf stands squarely on

its feet. You will want your dad or 4-H Club leader to help you with this, the first time.

Make a horn-and-hoof polish by mixing pumice stone with enough olive oil to make a paste. Use it like shoe polish.

## *Training*

You can teach an animal to lead when it is only a few days old. A calf will never forget even a few lessons.

A calf that is to be shown needs several training periods. Ten minutes of teaching every day are better than an hour a week, all at one time. However, several longer lessons, along with shorter ones, will best prepare your calf for shows. You will want to give it enough practice so it can stand well for quite a long time. Sometimes, there are many animals in the ring at one time. You don't want your calf to sag out of shape while waiting for the judge to line up the class. So, give it plenty of practice.

Use a show halter, if possible. Work with your calf until it will stand straight, with its head erect, and all four feet squarely underneath. It should move easily at the slightest tug on the lead strap.

## *Feeding*

If you are going to use feeds at the show that are different from those you provide on the farm, start the change when you begin fitting your calf. Sudden changes may throw it off feed, and it will not show well. Your calf will not show at its best unless it feels well.

Reduce by half the amount of grain provided at the last feeding before loading your calf for the fair. Continue to limit the grain the first two or three feedings away from home. Doing this will help keep your calf on feed.

## *Give Your Calf a Shine*

Your calf should already be clean from the baths and brushings you have been giving it during the fitting period. Make the last brushing before the show an extra good one. Finish with a soft cloth slightly dampened with olive oil . . . not enough to make the hair oily . . . just enough to make it shine and keep the hair in place.

## IN THE *Ring*



- Do your final fitting work early enough so you can go to the ring as soon as your class is called.

Show your calf from the time you leave the stall until you get back. The judge is usually somewhere in the middle of the ring at the start. He will have all the animals walk in a circle. If you and your calf are first into the arena, circle clockwise. This will put your calf between the judge and yourself.

- Walk backward and on the left side of your calf. Lead with your left hand. The extra part of the lead strap should be coiled in the right hand. You should be slightly ahead of the animal.

- Pay close attention to your calf, but keep an eye on the judge, too. That way you can be quick to do what he asks.

- Walk your calf slowly and smoothly. The hours of training before the show pay off here.

- When you are standing in the ring, see that your calf is squarely on all four feet with its back straight and its head up.

- When the judge tells you to move into the side-by-side line-up, leave some space between your calf and the next one.

- To change position when side-by-side, circle your calf around the others and come to the place the judge indicates. Don't try to have your calf walk backward.

- Most dairy animals appear best at a standstill, just when they are ready to take a step. It is hard to train an animal to pose this way, but it is worth the effort.

Remember, if the floor of the show ring is uneven, keep your calf from placing its front feet in low places. If you must choose, get the hind feet in the low place and the front ones on higher ground.

Sometimes you will be leading the winner—but not always. At times you may place last. But remember, keep on showing all the time. You have a good calf and you want everybody to know it.

This leaflet can help you get started showing dairy cattle. There are many things you have to learn by doing. On the next page is a score card often used in fitting and showing contests. Look it over. It tells you what the judge will expect of you.

# *Fitting and Showmanship Score Card*

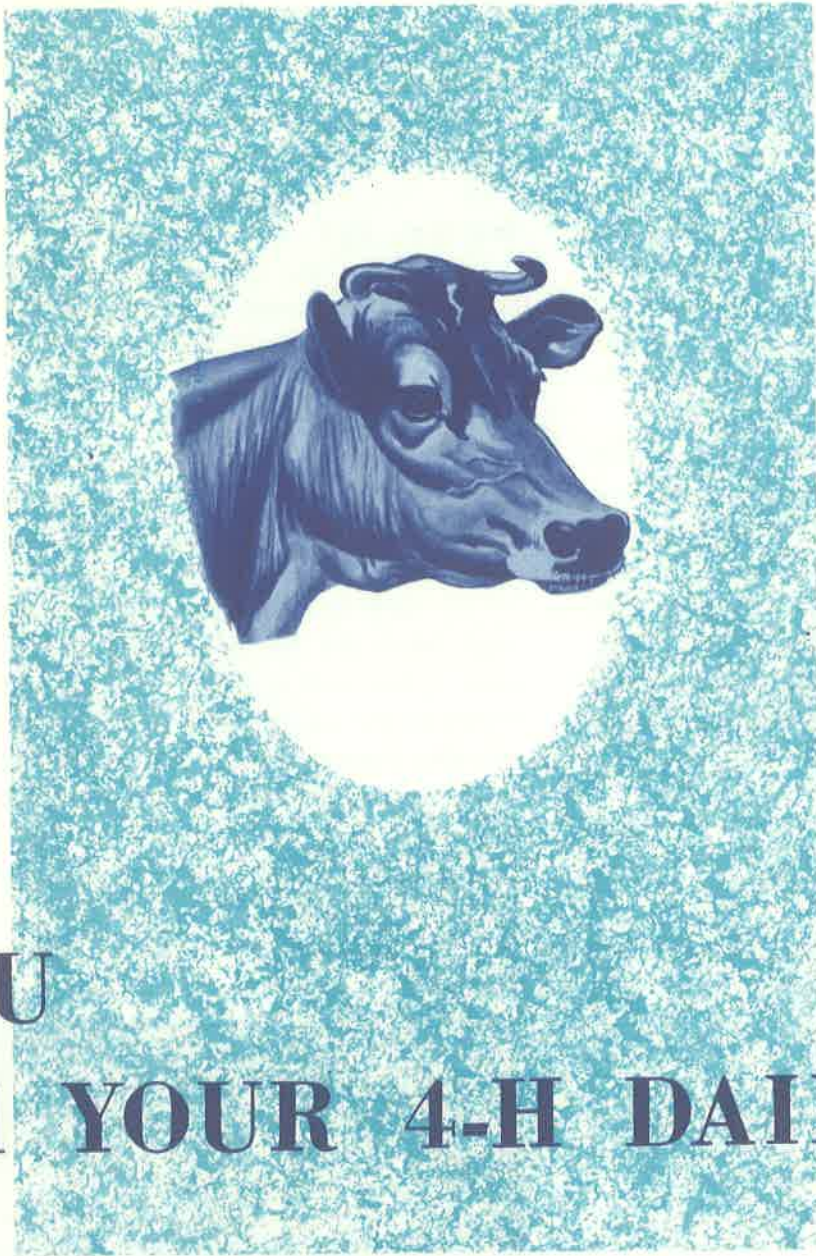
<b>Fitting</b> .....	<b>40%</b>
<b>CONDITION OF ANIMAL</b> .....	<b>15</b>
Animal in good flesh .....	5
Hair smooth, soft and glossy .....	5
Hide soft and pliable .....	5
<b>CLEANLINESS</b> .....	<b>15</b>
Free from stain .....	5
Hair clean .....	5
Ears clean .....	5
<b>CLIPPING</b> .....	<b>10</b>
Smooth job of clipping .....	5
Animal clipped in right places .....	5
 <b>Showing</b> .....	 <b>60%</b>
<b>TRAINING OF ANIMAL</b> .....	<b>10</b>
Animal leads well .....	5
Ease of posing .....	5
<b>HANDLING</b> .....	<b>15</b>
Leads slowly .....	5
Makes long turns .....	5
Keeps animal posed easily .....	5
<b>CONTESTANT</b> .....	<b>35</b>
Dressed in 4-H Club uniform .....	5
Continuous attention to animal .....	5
Keeps animal properly posed .....	5
Keeps eye on judge .....	5
Obeys orders of judge promptly .....	5
Ease of showmanship—not nervous .....	10
	<b>100%</b>

6/55—2,500

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 J. Earl Coke, Director, California Agricultural Extension Service.







**YOU  
and YOUR 4-H DAIRY COW**

# GETTING STARTED

## WHEN YOU BUY A COW

As a 4-H Club member you will want a cow that can be a high milk producer.

Before buying a cow, ask about her milk and butterfat production record. Ask about the production of her dam (mother) and grand dams (grandmothers). You do not want "boarders" in your herd. You want cows that will produce lots of milk and butterfat. A good cow should produce more than 400 pounds of butterfat per year.

Look in her ear. Make sure she has a CV tattoo. That means she has been vaccinated for Bangs' disease. Ask about her tuberculosis or TB test.

If your cow is a purebred, transfer her registration paper to your name. The fee for this is usually included in your purchase price. If you have a question, write to the secretary of your breed association.

## BREED ASSOCIATIONS

**Holstein-Friesian Association of America**  
Brattleboro, Vermont

**American Jersey Cattle Club**  
1521 East Broad Street  
Columbus 5, Ohio

**American Guernsey Cattle Club**  
Peterborough, New Hampshire

**Ayrshire Breeders' Association**  
Brandon, Vermont

**Brown Swiss Cattle Breeders' Association**  
Beloit, Wisconsin

**American Milking Shorthorn Society**  
313 South Glenstone Avenue  
Springfield 4, Missouri

## WHEN YOUR COW HAS HER CALF

Watch your cow carefully for a day or two before she calves. Be on hand when the calf is born. You are partners. You need the help of your cow. Your cow needs your help, too.

Clean all the mucus which often interferes with breathing from the calf's mouth and nostrils. Use a clean cloth or clean feed bag to wipe the calf dry. Provide a clean, dry place to keep the calf.

The colostrum, or first milk of the mother cow, contains necessary food for the baby calf. When the calf can stand by itself, wash the cow's udder clean and let the calf nurse.

Your cow should be given all of the fresh warm water she will drink soon after the calf is born. Bran with a little water and molasses is recommended as the first light feeding for your cow after calving. Gradually change over to your dairy ration after three or four days. Make your change by mixing the two feeds (reducing the bran and increasing the dairy mix) over a period of three or four days. If there is old feed left, clean it out of the feed box or manger before feeding the new.



## TRAINING YOUR COW

Train your cow properly and she will be a gentle, easy-milking cow the rest of her life. To train her properly, you should:

1. Wash her udder carefully with warm water, about one minute before you start milking.
2. Milk a few streams by hand into a strip cup to see if the milk is of good quality.
3. If you have no milking machine and are hand-milking, be sure to milk your cow out as fast as possible, massaging the udder as you milk. Milk her out completely.
4. If you have machines, start your cow milking with them right away. Put the teat cups on carefully. Stay with your fresh cow for the first milkings. Be sure she is milked out completely, but do not leave the teat cups on after she is milked out.
5. Your cow will like it and milk much better if you are regular in your milking time each day and follow the same routine at each milking.
6. If you don't get excited, your cow won't either. Be patient, she has a lot to learn in this new cow world – and besides, that swollen, caked udder is sore and tender.

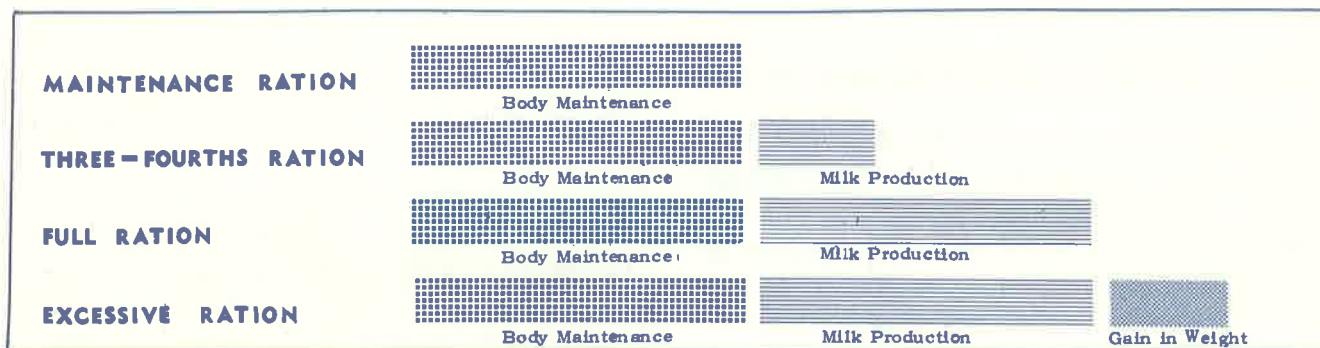
## FEED YOUR DAIRY COW ALL SHE NEEDS

All food that is eaten has a certain amount of food value. This food value is called digestible nutrients. There are six kinds of nutrients which are needed by a dairy cow. These are: (1) Proteins, (2) Carbohydrates, (3) Fats, (4) Water, (5) Minerals, (6) Vitamins.

Dairy cattle must have nutrients every day to supply two definite needs – body maintenance and milk production.

If we know how much a cow weighs and how much milk of a known butterfat percentage she is giving, we can figure exactly how much hay and concentrate we must feed her daily to take care of her nutrient requirements. By feeding a balanced ration which meets these requirements, we can keep the cow in good condition while she produces that amount of milk. If we feed her less, she will first drop off in milk production, then she will start to lose body weight.

If we feed her more, she probably won't produce more milk, but will put on body weight. Except at the end of her lactation, this gain in body weight means food and money wasted.



## THE THREE MUSTS OF MILKING

1. Stimulate milk flow by washing and massaging the udder just before milking. This is called preparing, or priming.
2. Your cow's udder is a perfect place for germs and infections to grow. It is warm, there is moisture and food (milk), and there are openings to the outside. For these reasons, you should be very careful with her. When you milk, be sure to take the machine off as soon as you have all the milk. The action of the

machine on the tender tissues of the udder will bruise it and cause infection.

When you are through milking, be sure the teats, and especially the ends of the teats are dry. This will cut down the chance of any bacteria growing at the end of teat and entering the udder through the teat canal.

3. Milk out all four quarters completely at each milking. If you do not do this, your cow will gradually dry up in one, or all, of her quarters.

## EXAMPLES OF DAIRY CONCENTRATE RATION TO BE FED WITH DIFFERENT TYPES OF HAY

PROTEIN HAY Alfalfa		MIXED HAY Oats and Vetch		CARBONATIOUS HAY Oats or Barley (Grain Hay)	
FEED	LBS.	FEED	LBS.	FEED	LBS.
Beet pulp	600	Beet pulp	500	Beet pulp	400
Barley	500	Barley	500	Barley	400
Oats	300	Millrun	400	Millrun	350
Coconut meal	300	Coconut meal	300	Coconut meal	400
Cottonseed meal	150	Cottonseed meal	150	Soybean meal	100
Rice bran	150	Rice bran	150	Cottonseed meal	150
Salt	20	Salt	20	Linseed meal	200
				Salt	20
<b>TOTAL LBS.</b>	<b>2,020</b>		<b>2,020</b>		<b>2,020</b>
<b>DIGESTIBLE PROTEIN 212</b>			<b>250</b>		<b>333</b>
<b>TOTAL DIGESTIBLE NUTRIENTS</b>	<b>1,494</b>		<b>1,512</b>		<b>1,524</b>

These are only examples of concentrate rations. It is possible to use many other feeds in the balanced ration. Many by-product feeds may also be used with good results. Ask your dairy leader or farm advisor to help you select a balanced ration that fits the feeds available in your locality.

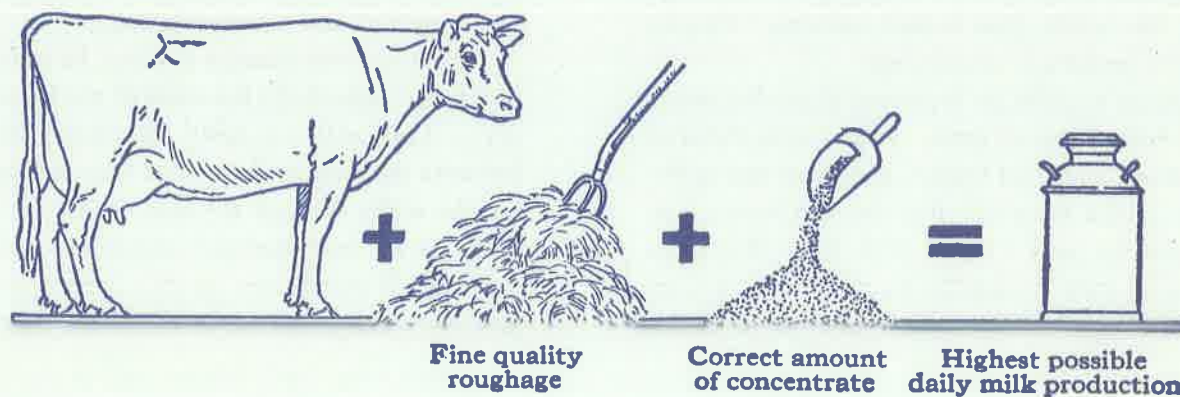
### FEEDING YOUR COW FOR PRODUCTION

The first rule in all feeding practices is to give your cow all the good quality roughage (hay, silage, pasture) she will eat. These are the least expensive feeds and they will take care of the body maintenance part of her diet as well as a portion of her milk production requirements.

If your cow is producing 30 lbs. of butterfat per month, she will get all the required nutri-

ents for body maintenance and milk production if she is eating all the good quality alfalfa hay she wants.

It is when your cow is producing at a high level that she cannot get enough nutrients from hay alone to meet these requirements. From the first through the 8th or 9th month of lactation your cow should be producing enough more milk and butterfat to require supplemental feeding in the form of concentrates.



## HOW DO WE FIND OUT HOW MUCH TO FEED?

If you are not testing your cow for production (and you should be), there is a "rule of thumb" which says to feed one pound of concentrates for every six pounds of milk produced daily.

If you are testing your cow's milk for butterfat production through DHIA work you will know what she is producing every month. There are two ways you can find out how much concentrates to feed. Select one and stick to it. Let's assume your cow is producing 45 lbs. butterfat per month.

METHOD NO. I



$\frac{\text{Monthly B. F. Production}}{6} = \text{lbs. of concentrates to feed daily}$
<p><u>Example:</u></p> $\frac{7\frac{1}{2} \# \text{ concentrates to feed daily}}{6 \overline{)45 \# \text{ B. F. per month}}}$

METHOD NO. II



$\frac{\text{Monthly B. F. Production} - 30}{2} = \text{lbs. of concentrates to feed daily}$						
<p><u>Example:</u></p> <table style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding: 0 10px;">45 # B. F.</td> <td style="padding: 0 10px;">7½ # concentrates daily</td> </tr> <tr> <td style="border-top: 1px solid black; padding-top: 5px;">30</td> <td style="border-top: 1px solid black; padding-top: 5px;">2 )15</td> </tr> <tr> <td style="border-top: 1px solid black; padding-top: 5px;">15</td> <td></td> </tr> </table>	45 # B. F.	7½ # concentrates daily	30	2 )15	15	
45 # B. F.	7½ # concentrates daily					
30	2 )15					
15						

## POINTS TO REMEMBER

### DRY COWS NEED GOOD CARE

After your cow has produced for you for ten months, she deserves a good rest. She has worked hard, but she is still working. During that six to eight week rest or dry period, she is preparing herself to have another calf as well as produce milk for another year.

Watch her carefully. Plan to have her gain weight. Feed her from two to five pounds of concentrate daily during this dry period. She will pay you back after she freshens in greater milk production.

### THINK BEFORE YOU HAVE YOUR COW BRED

The future of your dairy herd depends a lot on the kind of calves your cow has. Strive for a calf which will develop into a better cow than her mother. Here are some things to keep in mind:

1. If she is a purebred cow, breed her to a purebred bull.

2. If she is a grade cow, you should get a better calf if your cow is bred to a purebred bull.
3. Artificial insemination is an excellent way to breed your animal. It eliminates the expense of a bull and increases the possibilities of your cow producing an offspring which is capable of higher production than hers.

### WHAT ABOUT BUILDINGS AND EQUIPMENT?

One of the greatest items of expense, when you are getting started with a dairy cow is that of housing and equipment. A smart thing to do, if you are going to start with a dairy cow project, is to get the necessary equipment and provide the proper housing before you get your cow.

A lot of what you do will depend upon what you have at home to start with. You should have a clean, light, airy place to stanchion your cow for milking. You should have a shelter for her during the stormy winter days. It will be necessary for you to have some dry storage space for hay and concentrates and other pieces of equipment.

Your Farm Advisor has plans you can use for building your own barns and stanchions. Ask him to show them to you.

You will need a good milk bucket, milk strainer and milk holding containers, watering trough, feed boxes, and, of course, a milk stool.

It is important to take good care of anything you own. You will have considerable money invested in your equipment. Be sure to keep it clean and stored properly when not in use.

### PRODUCTION RECORDS ARE IMPORTANT

Good dairymen all over our nation join their local Dairy Herd Improvement Association or cow testing association in order that they may know month by month what their dairy animal is producing. "Don't whistle in the dark." By weighing and sampling and testing your milk for butterfat each month, you know exactly how well your cow is doing. A cow tester will run this test for you. He will give you a cow record form on which month by month he will keep a running account of the amount of milk, the amount of test, and the amount of butterfat your cow produces. From this you can tell:

1. If your cow is paying for the feed you feed her.
2. How much concentrates you should **feed her**.
3. If you should keep heifer calves from your cow to increase the butterfat average of your herd.

In these days, a dairy cow should produce at least 350 pounds of butterfat in order to pay for her keep. Any production above that is to your ad-

vantage. You should strive for a herd average of at least 400 pounds of butterfat yearly. Each month after the cow tester has finished testing your cow for butterfat production, change your concentrate feeding schedule so that she will get the right amount of feed to maintain her body and produce the milk she is capable of producing.

### KEEP YOUR 4-H RECORD BOOK UP-TO-DATE

In order for you to become a top-notch 4-H member, or a good business man, it is necessary that you keep track of all of the things that you do. A clock without any hands is like a record sheet without any entries. You can not tell whether your project is making a profit or loss. The 4-H record tells how you are doing financially with your projects, the activities and events you have participated in, and your achievements and accomplishments. It tells the story of your 4-H Club career.

The most important management practice of any enterprise is that of keeping good records. Keep your record book handy and make entries in it regarding everything you do in 4-H Club work.

### DISEASES CAN BE COSTLY

Dairy animals are just like people. They, too, get sick. Sometimes you can hardly tell it, other times they are very ill. They should be watched carefully and in almost every case **when** there is something wrong, you should call your veterinarian. He can tell much better than anyone else what the problem is and what should be done. Your 4-H Club leader or your Farm Advisor can tell you of some of the diseases of dairy cattle, such as Mastitis, Brucellosis (Bang's disease), Ketosis, and Anaplasmosis. There are many others.

Some of the things that you can and should take care of are lice, flies and cattle grubs. Lice usually appear on cattle in the fall and early winter. Horn flies appear and should be treated during the warm months of the year. Ticks appear generally in the spring and fall. Cattle grubs appear in the backs of the cattle from December through April. These parasites should be controlled to insure the good health of your animal. Because of the many different conditions under which you operate, contact your 4-H leader or Farm Advisor to find out what to do.

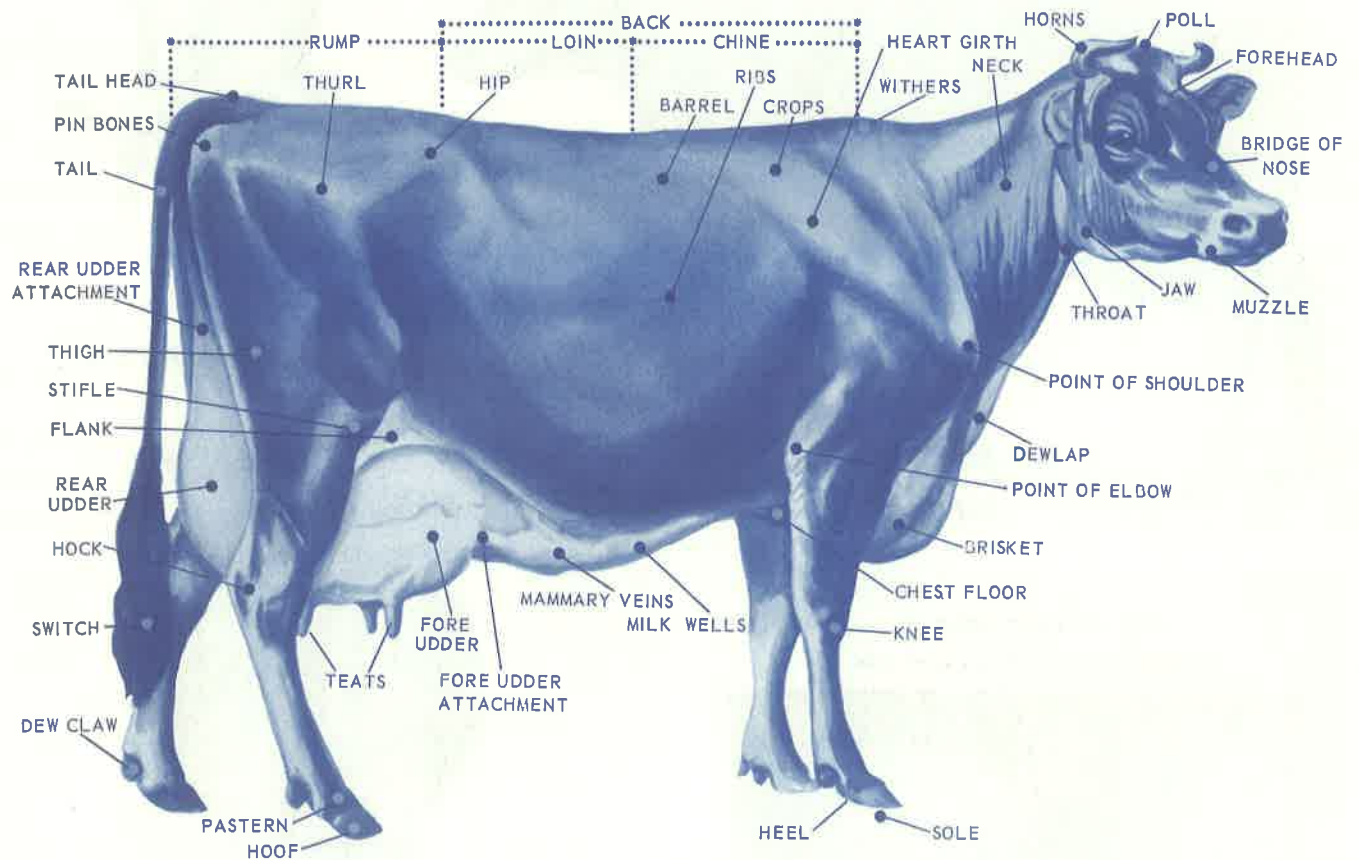


# WHEN ITS TIME TO JUDGE

## HIGH POINTS OF SELECTION

One of the events you'll enjoy the most in your project is taking your cow to the fair. You will learn more and have more fun if you understand the points of selection the judge uses in making his decisions.

The chart shows the parts of a dairy cow. You should learn them.



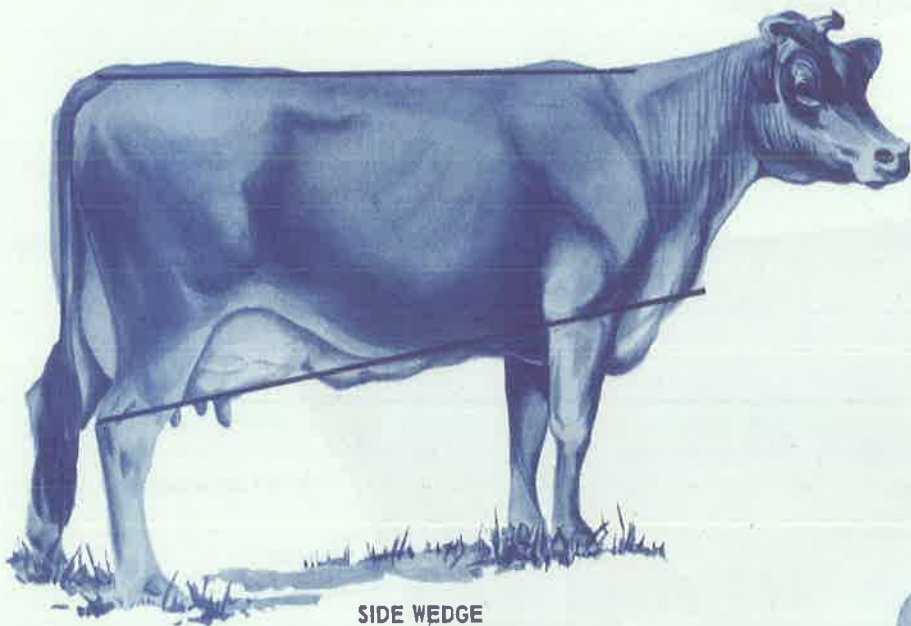
# SELECTION POINTS

The five main points used in selecting or judging dairy cattle are: dairy character, body capacity, udder or mammary development, feet and legs, and general appearance.

These are some of the things you will want to look for.



FRONT WEDGE AND TOP WEDGE



SIDE WEDGE

**MAMMARY DEVELOPMENT**  
Udder has uniform teats and level floor.



FEET AND LEGS



# SHOW YOUR COW AT ITS BEST

## IN STARTING

You and your cow are going to the fair! Both of you need to get ready. You'll be off to a good start if you begin to fit your cow at least a month before the show. However, this is only the finishing touch. Proper feeding and the right kind of care from birth are necessary if your cow is to do well in the show ring. Remember that your job is to help your animal make the best showing possible.

## CARE OF THE HAIR

Some warm sunny day about a month before the show, give your cow a bath. Use plenty of soap to remove the dirt from the hair. Rinse the soap away with clear water. Brush the hair the way you want it to go, while it still is a little damp. Brush it down from the center of the back. Then, blanket your cow and put it in a barn or shed and provide plenty of straw bedding to keep it clean.

Brushing your cow every day will pay off on show day. After brushing, rub the hide gently with your hands. If your cow has a lot of long, dead hair you can take this off by brushing with sand paper placed over a block of wood.



If white spots on the cow get stained with manure, wash these away as soon as possible. You may have to do this several times to remove the stain. Wash the tail switch often, especially if it is white.

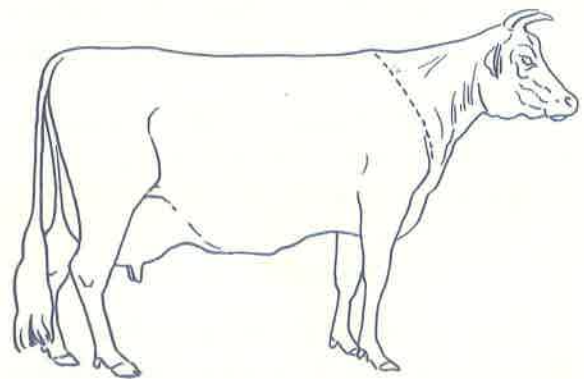
## CLIPPING

Some clipping improves the appearance. However, it is unnecessary to clip the entire body if enough time has been allowed for fitting. The time to clip the hair on your cow is about a week ahead of the show. Remember, use the hair to make your cow look its best, just as veteran showmen do.



As an example, Jerseys and Guernseys should have "dish faced" heads. If your animal belongs to one of these breeds, but has a flat face, it can be improved by leaving the hair around the eyes. Clip clean between the eyes. On other breeds trim all the hair from the face.

As another example, a good dairy animal should have a wide muzzle. Emphasize this by leaving the hair about the mouth.

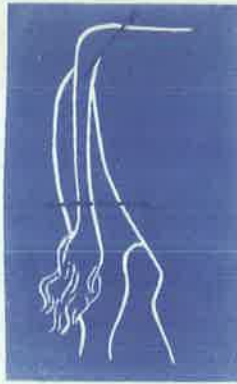


The neck should be clipped back to an imaginary line running from the point of the shoulder to the withers. If your cow happens to be U-necked leave the hair in the notch to fill it out.

Do not clip the belly of dairy heifers. Leaving this hair gives the appearance of greater depth of body.

## TAIL

Clip the hair on the tail from the top of the switch to the tail head. This will help the tail to appear long and thin.



## HORNS AND FEET

4-H Club cattle do not need horns to win in the show ring. Good herd management suggests taking them off. The dehorning job should be neat and clean.

However, some persons prefer to leave horns on show cattle. If you decide to leave the horns you will want to know how to polish them. Remove scratches on the horns and feet by taking off the surface with No. 1½ emery paper. First, tear the paper into strips ½-inch wide. Then pull these across the horn or hoof, like a shoe polishing cloth. Follow this with fine sandpaper. Don't take off too much at one time. If blood starts to show, stop.

If the hoofs are long, trim them back with a pair of hoof clippers. Smooth the hoofs with a light cutting wood rasp. Take off enough so your cow stands squarely on its feet. You will want your dad or 4-H Club leader to help you with this, the first time.

Make a horn-and-hoof polish by mixing pumice stone with enough olive oil to make a paste. Use it like shoe polish.

## TRAINING

You can teach an animal to lead when it is only a few days old. A cow will never forget even a few lessons.

A cow that is to be shown needs several training periods. Ten minutes of teaching every day are better than an hour a week, all at one time. However, several longer lessons, along with shorter ones, will best prepare your cow for shows. You will want to give it enough practice so it can stand

well for quite a long time. Sometimes, there are many animals in the ring at one time. You don't want your cow to sag out of shape while waiting for the judge to line up the class. So, give it plenty of practice.

Use a show halter, if possible. Work with your cow until it will stand straight, with its head erect, and all four feet squarely underneath. It should move easily at the slightest tug on the lead strap.

## FEEDING

If you are going to use feeds at the show that are different from those you provide on the farm, start the change when you begin fitting your cow. Sudden changes may throw it off feed, and it will not show well. Your cow will not show at its best unless it feels well.

Reduce by half the amount of grain provided at the last feeding before loading your cow for the fair. Continue to limit the grain the first two or three feedings away from home. Doing this will help keep your cow on feed.

## GIVE YOUR COW A SHINE

Your cow should already be clean from the baths and brushings you have been giving it during the fitting period. Make the last brushing before the show an extra good one. Finish with a soft cloth slightly dampened with olive oil — not enough to make the hair oily but just enough to make it shine and keep the hair in place.



## IN THE RING

Do your final fitting work early enough so you can go to the ring as soon as your class is called.

Show your cow from the time you leave the stall until you get back. The judge is usually somewhere in the middle of the ring at the start. He will have all the animals walk in a circle. If you and your cow are first into the arena, circle clockwise. This will put your cow between the judge and yourself.

Walk backward and on the left side of your cow. Lead with your left hand. The extra part of the lead strap should be coiled in the right hand. You should be slightly ahead of the animal.

Pay close attention to your cow, but keep an eye on the judge, too. That way you can be quick to do what he asks.

Walk your cow slowly and smoothly. The hours of training before the show pay off here.

When you are standing in the ring, see that your cow is squarely on all four feet with its back straight and its head up.

When the judge tells you to move into the side-by-side line-up, leave some space between your cow and the next one.

To change position when side-by-side, circle your cow around the others and come to the place the judge indicates. Don't try to have your cow walk backward.

Most dairy animals appear best at a stand-still, just when they are ready to take a step. It is hard to train an animal to pose this way, but it is worth the effort.

Remember, if the floor of the show ring is uneven, keep your cow from placing its front feet in low places. If you must choose, get the hind feet in the low place and the front ones on higher ground.

Sometimes you will be leading the winner—but not always. At times you may place last. But remember, keep on showing all the time. You have a good cow and you want everybody to know it.

This leaflet can help you get started showing dairy cattle. There are many things you have to learn by doing. Here is a score card often used in fitting and showing contests. Look it over. It tells you what the judge will expect of you.

FITTING AND SHOWING SCORE CARD	
TOTAL	100%
FITTING 40%	SHOWING 60%
CONDITION OF ANIMAL .....	15
Animal in good flesh .....	5
Hair smooth, soft and glossy .....	5
Hide soft and pliable .....	5
CLEANLINESS .....	15
Free from stain .....	5
Hair clean .....	5
Ears clean .....	5
CLIPPING .....	10
Smooth job of clipping .....	5
Animal clipped in right places .....	5
TRAINING OF ANIMAL .....	10
Animal leads well .....	5
Ease of posing .....	5
HANDLING .....	15
Leads slowly .....	5
Makes long turns .....	5
Keeps animal posed easily .....	5
CONTESTANT .....	35
Dressed in 4-H Club uniform .....	5
Continuous attention to animal .....	5
Keeps animal properly posed .....	5
Keeps eye on judge .....	5
Obeys orders of judge promptly .....	5
Ease of showmanship—not nervous .....	10

# Your 4-H Dairy Project Calendar

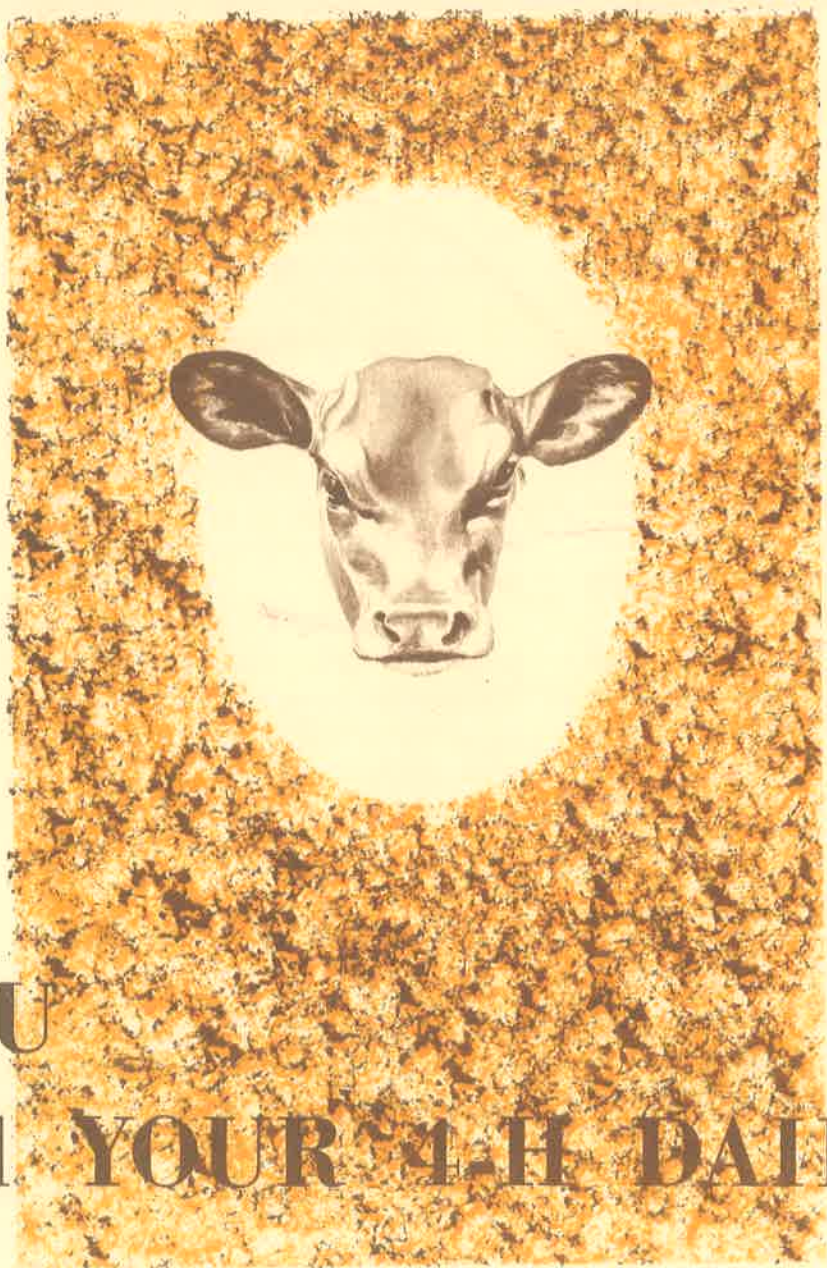
Here are examples of calendars like the ones you should plan and make at the beginning of the year to remind yourself what to do, and when to do it.

JANUARY	LICE CONTROL.	DATE COW FRESHENS	
FEBRUARY	CATTLE GRUB CONTROL. LICE CONTROL.	1st MONTH	START SLOW, THEN BUILDUP CONCENTRATE FEEDING. TEST COW FOR B.F. PRODUCTION. FEED ALL THE GOOD QUALITY ROUGHAGE COW WILL EAT EVERY DAY - HAY OR PASTURE.
MARCH	CATTLE GRUB CONTROL.		
APRIL	CATTLE GRUB CONTROL. PUT CATTLE ON IRRIGATED PASTURE. START FITTING CATTLE FOR EARLY SHOWS.	2nd MONTH	TEST FOR BUTTER FAT PRODUCTION.
		3rd MONTH	BREED COW. TEST FOR BUTTER FAT.
MAY	FLY CONTROL. FIT CATTLE FOR SUMMER SHOWS.	4th MONTH	TEST FOR BUTTER FAT.
JUNE	FLY CONTROL. PROVIDE SUMMER SHADE. COMPLETE 4-H RECORD BOOK. SECURE WINTER HAY SUPPLY.	5th MONTH	TEST FOR BUTTER FAT.
		6th MONTH	TEST FOR BUTTER FAT.
JULY	FLY CONTROL. START NEW 4-H RECORD.	7th MONTH	TEST FOR BUTTER FAT.
AUGUST	FLY CONTROL.	8th MONTH	TEST FOR BUTTER FAT.
SEPTEMBER	FLY CONTROL.	9th MONTH	TEST FOR BUTTER FAT.
OCTOBER	PROVIDE FOR PROTECTION DURING WINTER. TAKE CATTLE OFF IRRIGATED PASTURE.	10th MONTH	TEST FOR BUTTER FAT.
		11th MONTH	DRY COW OFF TO GIVE HER AT LEAST 8 WEEKS REST. FEED 2 LBS. PER DAY CONCENTRATES TO BUILD BODY FAT.
NOVEMBER	DEVELOP 4-H CLUB DAIRY DEMONSTRATION. WATCH MILKING PROCEDURE TO CURB MASTITIS INFECTION. CLIP FLANKS, UDDER AND TAIL TO ASSURE CLEAN MILK DURING WINTER.	12th MONTH	PROVIDE CLEAN DRY QUARTERS FOR COW TO HAVE CALF.
DECEMBER	LICE CONTROL.		

*This publication was prepared by Glenn Goble, Farm Advisor, Sacramento County, and a committee including Glenn Marders, Assistant State Leader; C. L. Pelissier, Extension Dairyman; Jack E. Herr, 4-H Club Specialist; and Farm Advisors S. D. Nelson, Siskiyou County, and Walt Fieg, Humboldt County.*

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**YOU  
and YOUR 4-H DAIRY CALF**

# GETTING STARTED

## WHICH BREED OF DAIRY CATTLE FOR YOU?

Will it be Jersey, Guernsey, Holstein, Ayrshire, Brown Swiss or Milking Shorthorn? There are good animals in all breeds. Your choice depends on the kind you like, its availability and the cost. Availability of good sires and the breed on your parents' farm may influence your choice.

## DO YOU WANT A GRADE OR PUREBRED CALF?

A purebred is an animal whose sire and dam are of the same breed and are both registered. All other animals are grades. Did you know 4-H'ers call a calf's mother the DAM, and the father the SIRE?

You can use either grades or purebreds for your 4-H Club project. A grade costs less money. However, if you want to show at fairs, you may want a purebred.

Many club members start with grades and go into purebreds later. Whichever way you decide, get a good calf.

Here are some things to keep in mind when selecting your calf -

- Is its sire registered?
- Is its dam a high producer? She should have produced over 400 pounds of butterfat.
- Is it healthy? If it has bright eyes, sleek hair and a clean tail, it probably is.
- Is it of good type?

## FEED YOUR DAIRY CALF THE 4-H WAY

Your dairy heifer calf needs your help to become a good cow. Give it high quality feed and the best care and you will have done your part in developing a profitable milk producer.

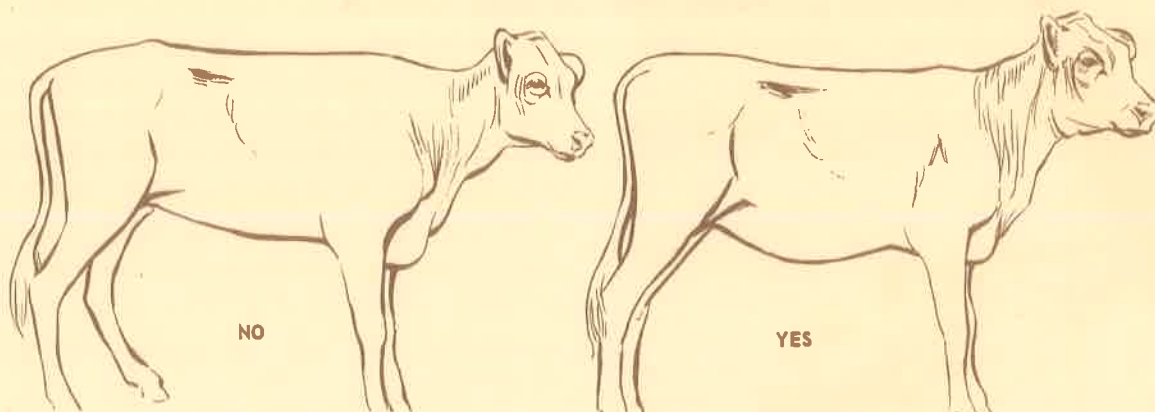
## GIVE YOUR CALF A GOOD START!

Your calf needs its mother's milk the first three days. Her milk at this time is very yellow and sticky. It is called COLOSTRUM. This milk is rich in vitamin A, protein, minerals, and protective substances that help the calf make a good start.

A calf should stand and nurse within two hours after birth. You will need to help the calf if it does not nurse by itself. Leave the calf with its mother for about 48 hours. Then put it in a clean pen by itself and feed it with a nipples pail. Use its mother's milk for the first four or five days.

## FEED THE RIGHT AMOUNT

Too much milk will make your calf sick and may even kill it. You don't want to starve your calf, but don't feed it too much, either. If you have scales, use them to make sure you give the right amount. If you don't have scales, a measuring cup will do. A cup of milk weighs about 1/2 pound.



Select good, strong, healthy calves like the one at the right.

If your calf is a Jersey or Guernsey, feed it 4 to 6 pounds of milk a day at the start. This is 8 to 12 cups. Ayrshires, Brown Swiss and Holsteins may use up to 8 pounds.

Your calf may not want this much. Good dairymen like their calves to be slightly hungry after each meal. Don't over-feed. As your calf grows, increase the amount of milk a little at a time. It should have about one pound of milk for every ten pounds of body weight.

Watch out for SCOURS! Diarrhea in calves is called SCOURS. If your calf develops this condition, you may have given it too much to eat. If this happens, reduce the amount of milk you are feeding by half.

How many meals should your calf have each day? Most calves get their milk twice a day, but some dairymen believe they do better when fed three times a day. Do it either way, but don't feed too much.

The temperature of the milk is important, too. Cold milk can cause scours. To avoid feeding your calf cold milk, either —

- Feed just after milking, or
- Warm the milk, using a thermometer to determine when the temperature reaches 100°F, and feed the milk to your calf as soon as possible.

Feed milk to your calf in either a shallow feeding pail or a nipped bucket. Whichever you use, be sure to wash and sterilize it carefully after every feeding. This is important to your calf's health.



## TWO WEEKS TO SIX MONTHS

After your calf has made a good start on whole milk, think about using cheaper feed. Most calves are ready for this change when two to three weeks old. If your calf is not doing well, give it whole milk for another week.

Several methods of feeding are used for calves between the ages of two weeks to six months. Some dairymen continue to use whole milk. Others use skim milk. Another way is to feed calf meal. You can buy a ready-prepared calf meal or mix it yourself. If you decide to buy the ready-prepared meal, be sure to follow the directions that come with it.

Would you like to mix your own? Here is a mixture used to raise many fine calves —

100 lbs. dried skim milk	100 lbs. wheat bran
100 lbs. rolled barley	50 lbs. linseed meal
100 lbs. rolled oats	10 lbs. steamed bone meal
5 lbs. iodized salt	

Start your calf on this meal as soon as it leaves its mother, usually when two or three days old. Rub a little on its mouth after it has had its milk. Sometimes, putting a pinch in its mouth helps give it the idea. After a day or two, put a small handful in the bottom of the bucket after the milk is gone. Never increase the amount more than a small handful over that given the day before. By the time your calf is four months old, it should be eating 3½ to 5 pounds a day. Continue this amount until it is six months old.

As your calf begins to eat meal, you can gradually reduce the milk. Some dairymen encourage calves to take all the meal they will eat, and stop feeding liquid milk by the time the calves are a month old.

Others prefer to continue the milk feeding until calves are about two or three months old. If you decide to follow this system, you may want to use skim milk in place of whole milk. If you don't have skim milk on your farm, you may buy dried skim milk. Mix one pound with nine pounds of warm water (100°F). One pound of this reconstituted skim milk can replace one pound of whole milk.

If you use skim milk, add one teaspoon of cod liver oil for each feeding.

## HAY FOR CALVES

In selecting hay for your calf, look for green color, fine stems, and many leaves. Either alfalfa, oats and vetch, or mixed pasture hay can be used. It is more important to have good hay than to worry too much about the kind. However, many calf raisers prefer alfalfa.

Give your calf a little hay each day, starting when the calf is taken from its mother. Take away what it doesn't eat and replace with new hay every day. After it starts to eat, increase the amount. Don't be afraid to waste hay on young calves. Let them pick out the best part. Then give what they leave to older cattle. Give your calf all the hay it will eat, but be sure it has enough of the other feeds, too.

## WATER

Have water available for your calf all the time after it leaves its mother. Be sure to rinse the water bucket and give fresh water every day.

## PASTURE

A small pasture is a good place for your calf to be after it is three or four months old. Calves should have their own pasture. Having your dairy calves in a pasture with older cattle isn't a good practice.

Pasture is often said to be the perfect feed for cattle. This is not true for young calves. They need other feed to grow and develop. There is no substitute for calf meal and hay for young calves.

## MINERALS

Hay, grain, pasture and other feeds all contain minerals. These feeds, along with salt and steamed bone meal, usually furnish all the minerals that dairy cattle need. Many dairymen like to have a box for steamed bone meal and another for salt where their calves can get the amount they want at any time.

## SIX MONTHS TO ONE YEAR

By the time your heifer is six months old, it is ready for a cheaper grain mixture. It will then do well on the grain mixture your dad feeds his cows.

Perhaps you would like to mix your own. If you are feeding alfalfa hay, or have your calf on irrigated pasture, use —

2 parts ground barley	2 parts wheat bran
2 parts oats	1 part linseed meal

Add one pound of salt and one pound of steamed bone meal to 100 pounds of feed.

With mixed hay, such as oats and vetch or hay cut from irrigated pasture, use 2 parts of barley, 2 of oats, 2 of bran, and 2 of linseed meal.

For grain hay, use equal parts of ground barley, oats, and wheat bran, plus two parts linseed meal.

Did you know that dairymen often call grain mixtures CONCENTRATES? Whatever concentrate you feed, be sure to give your heifer enough to keep it growing well. Two or three pounds a day usually are enough.

Good pasture is the cheapest feed for your calf at this age — but don't forget to give it all the good hay it will eat, too.





## ONE YEAR TO FRESHENING

From the time your heifer is one year old until three months before freshening, it will grow well on good quality pasture and hay.

Three months before she is due to have her calf, you can start feeding her grain again. This will help to keep her growing while she is developing her calf.

Start feeding the grain mixture at the rate of about two pounds a day. Add 1/4 pound per day until she is getting the amount you want her to have. A good rule is to feed 1/2 pound for every 100 pounds she weighs. For example, a

Holstein weighing 1,000 pounds would get five pounds of grain mixture.

A good grain mixture for a heifer heavy with calf is equal parts of bran, oats, and beet pulp. If she should stop eating, do not feed concentrates for a day. Then start again at the two pounds a day rate. Increase the amount a little each day.

A few days before your heifer freshens, her udder will start to swell and becomes tight. When this happens, stop feeding the grain mixture.

Now you are ready for the 4-H Club manual *You and Your 4-H Dairy Cow*. It will tell you how to feed your cow after she freshens.

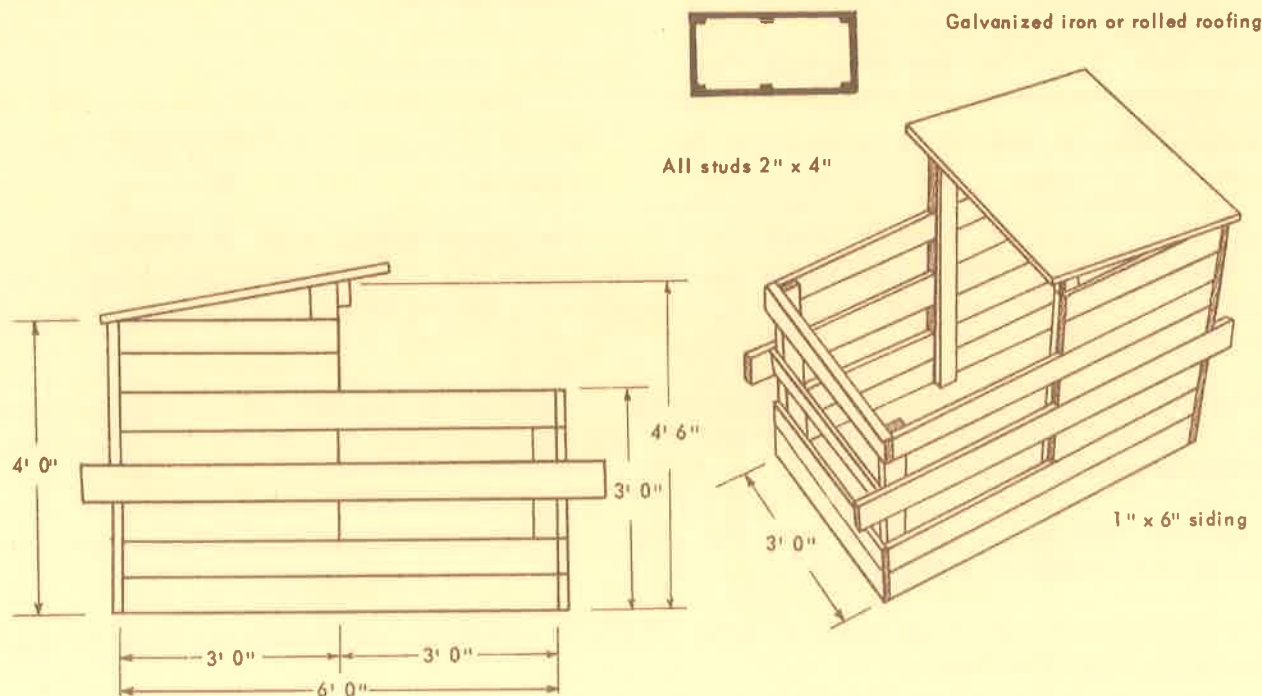
## GIVE YOUR CALF A GOOD HOME

Almost any kind of building will make a suitable home for your calf. Cold weather will not hurt it. On the other hand, drafts or damp bedding are almost sure to cause trouble.

If you have to build a place, here is a plan you can use. It doesn't cost much. Calves

often do better in this kind of shed than in others that cost much more.

Straw or wood shavings make good bedding. If you decide on wood shavings, make sure they are dry. You will also want your calf to have hay. If not, it may eat bedding and get sick.



# GUIDE FOR FEEDING

AGE OF CALF	FEED TO USE	AMOUNT EACH DAY	
		Ayrshire Brown Swiss Holstein	Jersey Guernsey
Birth - 3 days	Colostrum .....	All calf wants	
3 days - 2 weeks	Whole Milk .....	12 - 15 cups (Divide amount by 2, if feeding twice a day. Divide by 3, if feeding 3 times a day.)	9 - 12 cups
2 weeks - 6 months	Skim Milk, until calf is 2 months of age .....	1 pound for each 10 pounds body weight of calf. Divide amount by 2 and feed twice a day.	
	Calf Meal Mix ① .....	All calf will eat - up to 5 pounds a day.	
	plus Hay, salt, steamed bone meal and water .....	All calf will eat.	
<i>OR</i> 2 weeks - 6 months	Calf Meal Mix ① .....	All calf will eat - up to 5 pounds a day.	
	plus Hay, salt, steamed bone meal and water .....	All calf will eat.	
6 months - year	Pasture, hay, salt, steamed bone meal and water .....	All heifer will eat.	
	plus Concentrate Mix ② .....	2½ - 3 pounds a day	2 - 2½ pounds a day
1 year - 3 months before freshening	Pasture, hay, salt, steamed bone meal and water .....	All heifer will eat.	
3 months before freshening to near freshening	Pasture, hay, salt, steamed bone meal and water .....	All heifer will eat.	
	plus Concentrate Mix ③ .....	2 - 3 pounds each day.	

① Calf Meal Mix  
100 lbs. dried skim milk  
100 lbs. rolled barley  
100 lbs. rolled oats

100 lbs. wheat bran  
50 lbs. linseed meal  
10 lbs. steamed bone meal  
5 lbs. iodized salt

② Concentrate Mix  
2 parts ground barley  
2 parts oats  
2 parts wheat bran  
1 part linseed meal

③ Concentrate Mix -  
Equal parts of  
Wheat bran  
Ground oats  
Dried beet pulp

WHEN BUYING A CALF started by someone else, be sure to ask how much and what kind of feed it has been getting. You will have less trouble if you use the same kind of feed for a while. If you make a change, do it gradually.

IN MOVING BABY CALVES, reduce the amount of milk and calf meal by one-half the last feeding before moving. This amount should be continued during the trip. After the trip, the feed can be gradually increased to the normal amount.

IN MOVING OLDER CALVES, reduce the amount of milk or concentrates they receive by one-half during the trip. Hay should be fed as usual.

FEED A BULL CALF just as you would a heifer. The only difference is that bulls are larger for their age and need a little more feed.

# KEEP YOUR CALF HEALTHY

The best way to protect the health of your calf is by feeding the right amount of the right foods.

1. Feed at the same time each day.
2. Be sure to wash and sterilize the buckets you use to feed milk.
3. Keep your calf in a clean, dry place.
4. Provide clean, fresh water.

## DISEASES

Protect your heifer from the disease called BRUCELLOSIS. A state law says all dairy

heifers must be vaccinated for this disease between 4 to 12 months of age. The state pays for this. All you have to do is call your veterinarian when your calf is four months old. Be sure he puts a tattoo in your calf's ear. Before you move your heifer off the farm, you must be able to show that it has been vaccinated for this disease.

BLACK LEG and ANTHRAX are two other diseases to vaccinate for. In many areas these kill cattle not protected by vaccination. Your veterinarian or Farm Advisor will help you decide if you need to do this.

# HOW IS YOUR HEIFER DOING?

As you feed and care for your heifer, you will want to watch its eyes, hair and tail. Bright eyes, soft hair and a clean tail are signs your heifer is growing and doing well.

This chart will help you compare the size of your calf with others of its age. Remember that these figures are averages. Your calf may be smaller or larger.



Age	AYRSHIRE	GUERNSEY	HOLSTEIN	JERSEY
Birth	72 lbs.	65 lbs.	90 lbs.	53 lbs.
1 month	89	77	112	67
3 months	158	133	193	121
6 months	293	260	355	243
9 months	433	389	509	360
1 year	538	490	632	450
15 months	638	584	746	530
18 months	725	663	845	601
21 months	818	737	952	665
2 years	902	818	1069	733
27 months	909	876	1151	816

If you don't have scales, you can check the growth of your heifer by measuring the heart girth. The heart girth is the distance around the body behind the front legs and behind the withers.

## DISTANCE IN INCHES AROUND THE HEART GIRTH

Age	AYRSHIRE	GUERNSEY	HOLSTEIN	JERSEY
Birth	29	28	31	27
1 month	31	30	34	30
3 months	38	36	40	35
6 months	45	43	49	44
9 months	51	50	55	50
1 year	56	54	59	54
15 months	59	58	63	58
18 months	61	61	65	60
21 months	63	63	68	63
2 years	66	66	71	65
27 months	68	67	74	67

## BREEDING YOUR DAIRY HEIFER

When your heifer is old enough you will want to have her bred. The right age for breeding depends on the breed of your heifer.

Ayrshire	- 17 to 19 months old
Guernsey	- 16 to 18 months old
Holstein	- 18 to 20 months old
Jersey	- 15 to 17 months old

Many heifers are too small for their age at breeding time. If yours is, you may wait until she grows more. Modern dairymen use the body weight of heifers rather than age to decide when to breed. How much should your heifer weigh? If you have no scales, what should her heart girth measure at the time she is bred?

## SHOW YOUR CALF AT ITS BEST

### IN STARTING

You and your calf are going to the fair! Both of you need to get ready. You'll be off to a good start if you begin to fit your calf at least a month before the show. However, this is only the finishing touch. Proper feeding and the right kind of care from birth are necessary if your calf is to do well in the show ring. Remember that your job is to help your animal make the best possible showing.

### CARE OF THE HAIR

Some warm sunny day about a month before the show, give your calf a bath. Use plenty of soap to remove the dirt from the hair. Rinse the soap away with clear water. Brush the hair the way you want it to go, while it still is a little damp. Brush it down from the center of the back. Then, blanket your calf and put it in a barn or shed and provide plenty of straw bedding to keep it clean.

Brushing your calf every day will pay off on show day. After brushing, rub the hide gently with your hands. If your calf has a lot of long, dead hair you can take this off by brushing with sand paper placed over a block of wood.

If white spots on the calf get stained with manure, wash these away as soon as possible. You may have to do this several times to remove the stain. Wash the tail switch often, especially if it is white.

### CLIPPING

Some clipping improves the appearance. However, it is unnecessary to clip the entire body if enough time has been allowed for fitting. The time to clip the hair on your calf is about a week ahead of the show. Remember, use the hair to make your calf look its best, just as veteran showmen do.

As an example, Jerseys and Guernseys should have "dish faced" heads. If your animal belongs to one of these breeds, but has a flat face, it can be improved by leaving the hair around the eyes. Clip clean between the eyes. On other breeds trim all the hair from the face.



As another example, a good dairy animal should have a wide muzzle. Emphasize this by leaving the hair about the mouth.

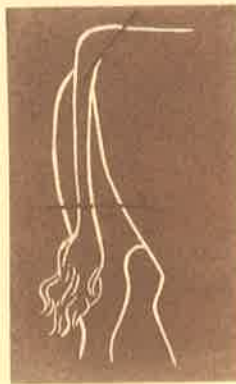
The neck should be clipped back to an imaginary line running from the point of the shoulder to the withers. If your calf happens to be U-necked, leave the hair in the notch to fill it out.



Do not clip the belly of dairy heifers. Leaving this hair gives the appearance of greater depth of body.

### **TAIL CLIPPING**

Clip the hair on the tail from the top of the switch to the tail head. This will help the tail to appear long and thin.



### **HORNS AND FEET**

4-H Club cattle do not need horns to win in the show ring. Good herd management suggests taking them off. The dehorning job should be neat and clean.

However, some persons prefer to leave horns on show cattle. If you decide to leave the horns you will want to know how to polish them. Remove scratches on the horns and feet by taking off the surface with No. 1½ emery paper. First, tear the paper into strips 1/2-inch wide. Then pull these across the horn or hoof, like a shoe polishing cloth. Follow this with fine sandpaper. Don't take off too much at one time. If blood starts to show, stop.

If the hoofs are long, trim them back with a pair of hoof clippers. Smooth the hoofs with a light-cutting wood rasp. Take off enough so your calf stands squarely on its feet. You will want your dad or 4-H Club leader to help you with this, the first time.

Make a horn-and-hoof polish by mixing pumice stone with enough olive oil to make a paste. Use it like shoe polish.

### **TRAINING**

You can teach an animal to lead when it is only a few days old. A calf will never forget even a few lessons.

A calf that is to be shown needs several training periods. Ten minutes of teaching every day are better than an hour a week, all at one time. However, several longer lessons, along with shorter ones, will best prepare your calf for shows. You will want to give it enough practice so it can stand well for quite a long time. Sometimes, there are many animals in the ring at one time. You don't want your calf to sag out of shape while waiting for the judge to line up the class. So, give it plenty of practice.

Use a show halter, if possible. Work with your calf until it will stand straight, with its head erect, and all four feet squarely underneath. It should move easily at the slightest tug on the lead strap.

### **FEEDING**

If you are going to use feeds at the show that are different from those you provide on the farm, start the change when you begin fitting your calf. Sudden changes may throw it off feed, and it will not show well. Your calf will not show at its best unless it feels well.

Reduce by half the amount of grain provided at the last feeding before loading your calf for the fair. Continue to limit the grain the first two or three feedings away from home. Doing this will help keep your calf on feed.

### **GIVE YOUR CALF A SHINE**

Your calf should already be clean from the baths and brushings you have been giving it during the fitting period. Make the last brushing before the show an extra good one. Finish with a soft cloth slightly dampened with olive oil — not enough to make the hair oily but just enough to make it shine and keep the hair in place.

## IN THE RING

Do your final fitting work early enough so you can go to the ring as soon as your class is called.

Show your calf from the time you leave the stall until you get back. The judge is usually somewhere in the middle of the ring at the start. He will have all the animals walk in a circle. If you and your calf are first in the arena circle clockwise. This will put your calf between the judge and yourself.

Walk backward and on the left side of your calf. Lead with your left hand. The extra part of the lead strap should be coiled in the right hand. You should be slightly ahead of the animal.

Pay close attention to your calf, but keep an eye on the judge, too. That way you can be quick to do what he asks.

Walk your calf slowly and smoothly. The hours of training before the show pay off here.

When you are standing in the ring, see that your calf is squarely on all four feet with its back straight and its head up.

When the judge tells you to move into the side-by-side line-up, leave some space between your calf and the next one.

To change position when side-by-side, circle your calf around the others and come to the place the judge indicates. Don't try to have your calf walk backward.



Most dairy animals appear best at a standstill, just when they are ready to take a step. It is hard to train an animal to pose this way, but it is worth the effort.

Remember, if the floor of the show ring is uneven, keep your calf from placing its front feet in low places. If you must choose, get the hind feet in the low place and the front ones on higher ground.

Sometimes you will be leading the winner — but not always. At times you may place last. But remember, keep on showing all the time. You have a good calf and you want everybody to know it.

This leaflet can help you get started showing dairy cattle. There are many things you have to learn by doing. Here is a score card often used in fitting and showing contests. Look it over. It tells you what the judge will expect of you.

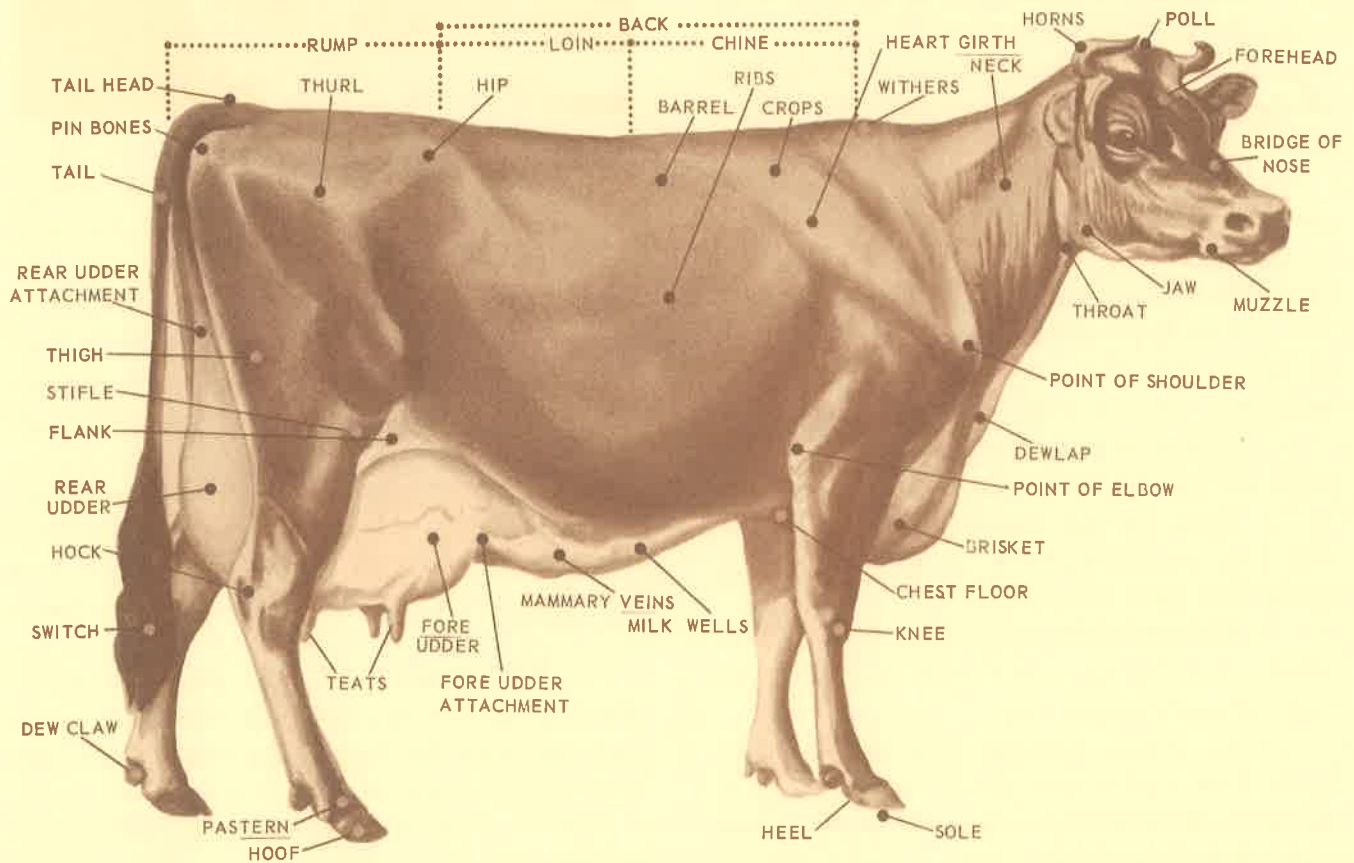
### FITTING AND SHOWING SCORE CARD

TOTAL 100%

FITTING 40%		SHOWING 60%	
CONDITION OF ANIMAL .....	15	TRAINING OF ANIMAL .....	10
Animal in good flesh.....	5	Animal leads well.....	5
Hair smooth, soft and glossy.....	5	Ease of posing.....	5
Hide soft and pliable.....	5	HANDLING.....	15
CLEANLINESS.....	15	Leads slowly.....	5
Free from stain.....	5	Makes long turns.....	5
Hair clean.....	5	Keeps animal posed easily.....	5
Ears clean.....	5	CONTESTANT.....	35
CLIPPING.....	10	Dressed in 4-H Club uniform.....	5
Smooth job of clipping.....	5	Continuous attention to animal.....	5
Animal clipped in right places.....	5	Keeps animal properly posed.....	5
		Keeps eye on judge.....	5
		Obeys orders of judge promptly.....	5
		Ease of showmanship—not nervous.....	10

Showing dairy cattle is a lot of fun. Sometimes you can win prizes doing it. 4-H field days, county and district fairs, as well as the California State Fair and the Junior Grand National Livestock Show are places to show what you can do.

Taking part in these events gives you an opportunity to learn to judge dairy cattle. Here is a picture of a dairy cow which shows the names of the parts judges use in giving their reasons for the placings they make.



### WOULD YOU LIKE TO GIVE A DEMONSTRATION?

There are special awards for 4-H Club members who can give good demonstrations. Would you like to try for one? You can't lose, even if you don't win a prize. Just by doing it, you will learn to talk in front of a group of people. This will come in handy some day, no matter where you go or what you do.

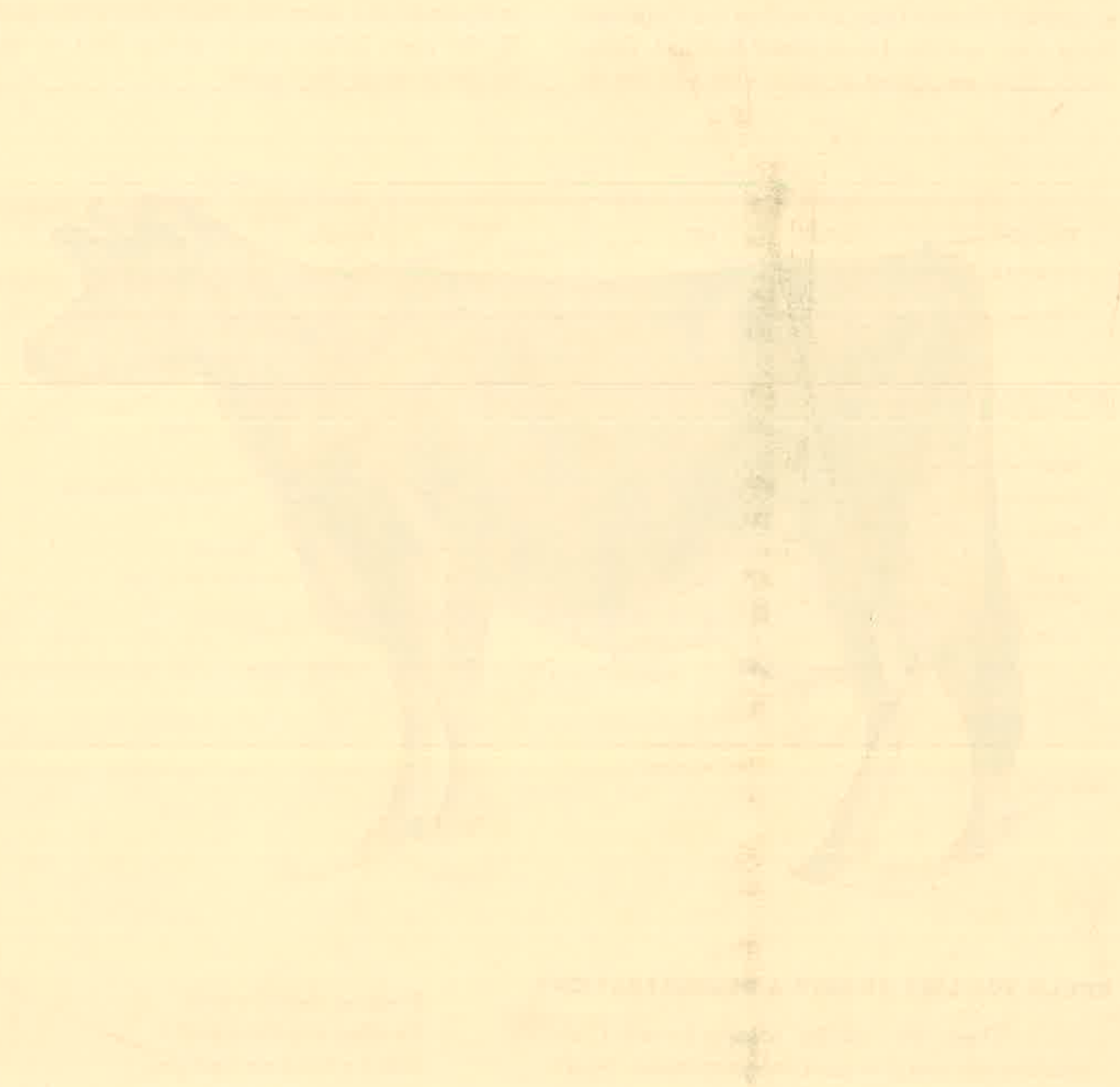
Your experience raising a calf will help you give a good demonstration.

Here is a list of suggested topics for demonstrations:

- Selecting a dairy calf
- Start your dairy calf right

- Feeding the baby calf
- Feeding the dairy heifer
- Build a low cost calf pen
- How are your calves doing? Are they big enough for their age?
- Fitting a dairy heifer for the show ring
- Showing a dairy calf
- Dehorning your calf

There are others. Maybe you can think of better ones. Whatever the subject, remember the object is to show others how. Show them in a way that is so interesting they would like to go home and try it. Show them well enough so they can go home and do it.



*This publication was written by Leland S. Frey, Farm Advisor, Tehema County, with revisions by the State 4-H Dairy Committee including Glenn Marders, Assistant State Leader; C. L. Pelissier, Extension Dairyman; Jack E. Herr, 4-H Club Specialist; and Farm Advisors Walt Fieg, Humboldt County, Glenn Goble, Sacramento County, and S. D. Nelson, Siskiyou County.*

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# DAIRY CATTLE SHOWMANSHIP

## THE ACT OF DISPLAYING AN ANIMAL TO ITS BEST ADVANTAGE

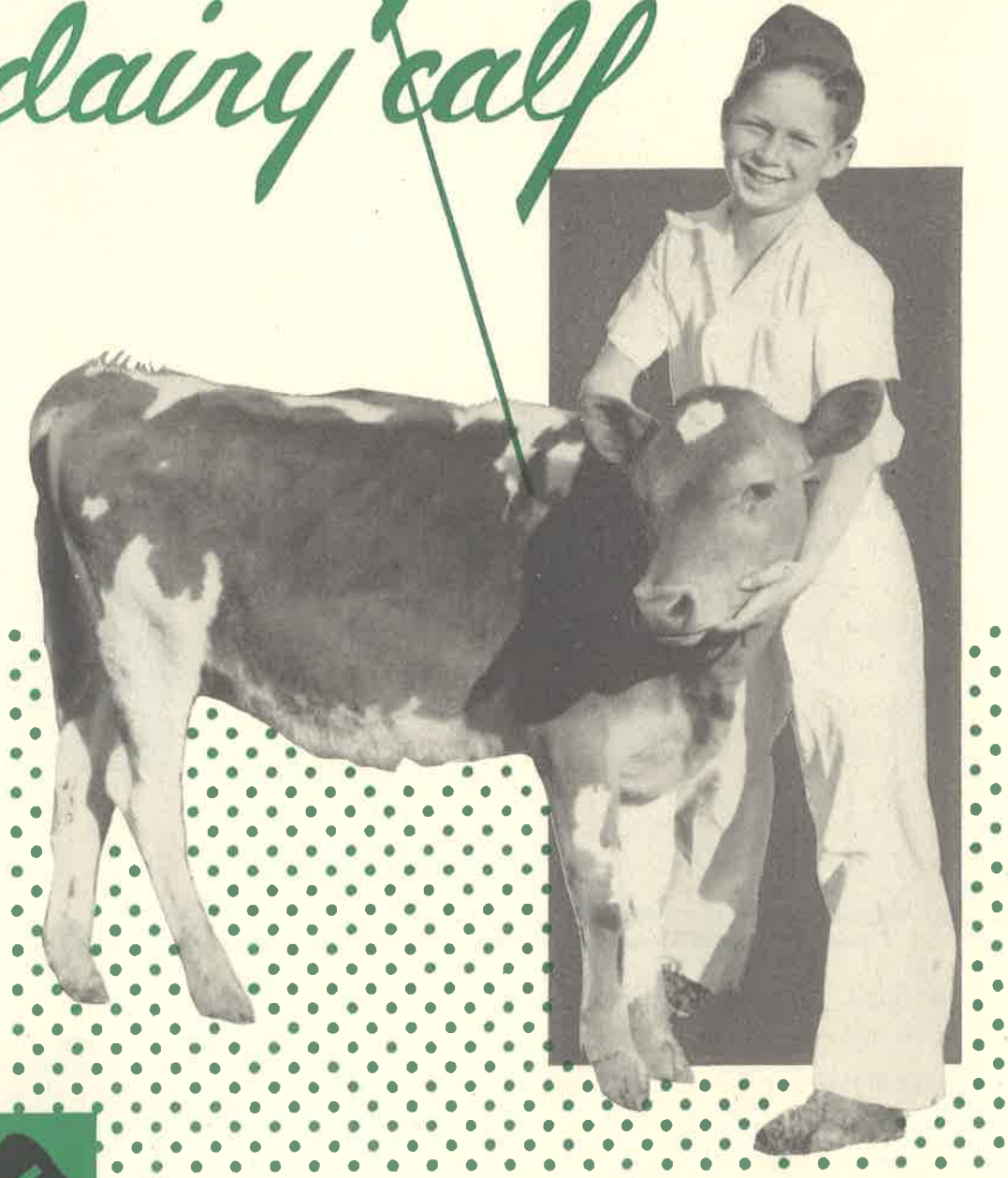
1. Make sure the animal is clean, well groomed, and well trained. This should include recent clipping, hoof trimming if needed, cleaning inside the animals' ears, and removing any stains on the legs or body.
2. Make sure the halter is the right size, neat, clean, and well fitted. The nose band should fit about half way between the nostrils and the eyes. Rope halters or wide leather beef type halters should not be used.
3. The showman should be clean and neat, dressed in white or wearing the official uniform for the show and wearing suitable shoes. Hard soled shoes are recommended; rubber boots should never be worn. Belts should be worn on pants with belt loops.
4. Showman should ---
  1. Lead at a graceful walk in a clockwise direction with the animals head held high enough for impressive style and carriage.
  2. Walk in an upright position, not crouching, leaning, or squatting.
  3. Lead the animal with a short shank that is held in about two loops in the left hand.
  4. Explicitly follow the directions of the judge.
  5. Follow accepted practices in leading. Leading with either hand is equally acceptable. However, it is general practice to walk backwards, holding the shank in the left hand, while being judged. Often it is easier to lead an unruly animal with the right hand and there should be no discrimination.
  6. Lead from the left front of the animal except briefly when it is necessary to adjust the tail-head or pinch the loin. Do not fuss with the animal when it is properly posed.
  7. Properly position the animals feet in relation to the judge. Do not position the hind legs by stepping on the feet. Do this by pressure on the halter and point of the shoulder with the fingers of the right hand.
  8. Anticipate where the animals front feet should be and ideally walk it into that position when asked to stop.
  9. Make sure the animal looks its best from the time it enters the ring until it leaves. Leave adequate room between animals to allow both showman and judge room to work.
5. ATTITUDE: The showman should--
  1. Be alert but polite and courteous to the judge and fellow showmen.
  2. Keep his animal under control at all times and make frequent glances at the judge to watch for his directions.
  3. Be prepared to answer questions that would normally be asked by a judge such as, "When was your calf born?" Or "What is the sire of your animal?"

4. Be prepared to lead any animal the judge designates. When changing to lead another animal, always go on the outside of the show circle so that you never go between the judge and his view of any animal or showman.
5. Enter the ring on time and do not cause delay by visiting with others.

#### 6. BASIC TECHNIQUES----

1. Moving into the ring; hold the lead strap in the right hand and walk briskly around the ring until the judge or ring clerk indicates otherwise.
2. Judge moving around the front of the animal, he should quickly move to give the judge the best view of the animal.
3. Turning the animal's head slightly towards the judge when he is handling the hair and hide.
4. Stopping and placing the animal to advantage making use of the slope of the ground to stand the animal with the front feet level with or higher than the back feet. He should recognize the conformation faults of the animal he is leading and show it in a manner that will minimize these faults
5. When called to the center of the ring, walk forward with the lead strap in the right hand to the designated area.
6. The leadsman should always walk in a clockwise direction around the animal.
7. Moving from one position to another; the leadsman may move the animal ahead, turn clockwise, come back through the same position and directly into the new position. Alternatively, the leadsman may back the animal up and go directly into the position indicated.

# Select your own dairy calf



By **LELAND S. FREY**  
Farm Advisor, Tehama County

**AGRICULTURAL EXTENSION SERVICE  
COLLEGE OF AGRICULTURE  
UNIVERSITY OF CALIFORNIA**

## Do You Know How to Buy a Good Dairy Calf?

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Do you resemble your mother and father? Calves do theirs. You can't expect a calf to grow up to be a good cow unless its mother is a good one. You want your calf to be a good producer. Then get one whose mother produced over 350 pounds of butterfat in one year. Its father should be registered. Did you know that 4-H'ers call a calf's mother the DAM, and the father the SIRE?



## Which Breed of Dairy Cattle Do You Like?

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Choose the one you like best. There are good ones in all breeds. As your 4-H Club dairy calf project develops into a herd, you may find it an advantage to have the breed that is popular in your neighborhood.

Is your father a dairyman? If he is, you may want the same breed he keeps. Maybe you can make a deal with him later to use his bull.



## Do You Want a Grade or Purebred Calf?

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A purebred, you know, is an animal whose sire and dam both have registration papers. A grade is one whose sire is purebred, but the dam is not. You can use either one in the 4-H Club. A grade will cost you less money than a purebred. On the other hand, if you want to show at fairs a good purebred will be better.

Many club members start with grades and go into purebreds later. Whichever way you decide, get a good one.



## Is This Calf a Good Buy?

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Did its dam produce over ~~4~~50 pounds of butterfat in a year? Is its sire a purebred bull? Is it healthy? If *proven* it has bright eyes, sleek hair and a clean tail it probably is healthy.

Don't pay more than you have to, but remember, a good calf is worth more than a poor one.

A heifer calf with a twin brother is not a good buy. This kind of calf is called freemartin. Most of them will never have calves.

## Does It Pay to Go to This Much Trouble?

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Yes it does. Before your calf gets to be a cow, you will spend more money for feed than you spent for the calf.

She has to pay you back in milk. Some cows will not. Good ones produce well and make money.

Make certain you get your money's worth when you buy.





**GUERNSEY** A dairy breed developed on the Guernsey Island which is in the English Channel near France.

**Color:** Fawn and white with yellow skin and clear or buff muzzle.

**Size:** Cows—1100 pounds; Bulls—1700 pounds.

**Milk:** Very yellow in color and contains about 5 per cent butterfat.

**Horns:** Medium size and amber color.

Guernseys are noted for gentle disposition.

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**HOLSTEIN** A dairy breed developed in Holland.

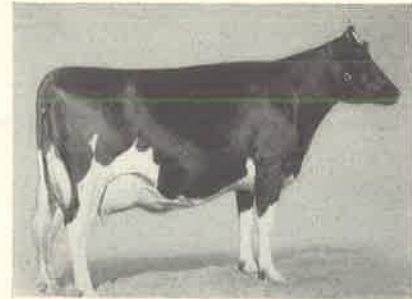
**Color:** Black and white.

**Size:** Cows—1500 pounds; Bulls—2000 pounds.

**Milk:** Contains about 3.5 per cent butterfat.

**Horns:** Inclining forward, incurving.

Holsteins are noted for large size and for producing large quantities of milk.



**JERSEY** A dairy breed developed on the Island of Jersey, which is near the Guernsey Island.

**Color:** Fawn, cream, mouse gray, brown and black, with or without white markings. Muzzles and tongues usually black.

**Size:** Cows—1000 pounds; Bulls—1500 pounds.

**Milk:** Yellow in color and contains about 5.3 per cent butterfat.

Jersey cattle are noted for refinement and rich milk. They are the smallest of the dairy breeds.

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**MILKING SHORTHORNS** A dual purpose breed developed in England, sometimes called Durhams.

**Color:** Red, white, either solid or mixed or roan.

**Size:** Cows—1500 pounds; Bulls—2000 pounds.

**Milk:** Contains about 4 per cent butterfat.

**Horns:** Grow out and down.

Milking shorthorns are noted for producing both meat and milk.



# Know your breeds

**AYRSHIRE** A dairy breed developed in Scotland.

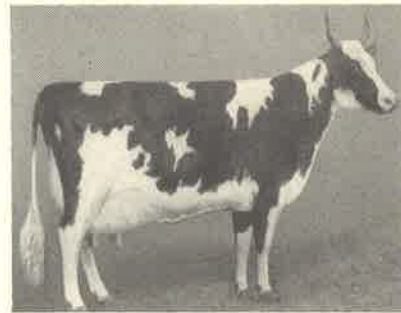
**Color:** Red of any shade, mahogany, brown, with white, or white alone, each color clearly defined.

**Size:** Cows—1150 pounds; Bulls—1800 pounds.

**Milk:** Contains about 4 per cent butterfat, very white in color.

**Horns:** Long and turned gracefully up and outward.

Ayrshires are noted for even udders and style.



**BROWN SWISS** A breed developed in Switzerland and one of the oldest breeds of cattle known.

**Color:** Light or dark brown or gray.

**Size:** Cows—1400 pounds; Bulls—1900 pounds.

**Milk:** Contains about 4 per cent butterfat.

**Horns:** Inclining forward and slightly up. They are noted for ruggedness and long life.

## ANSWERS TO THE QUIZ

1. Yes 2. No 3. Yes 4. Yes 5. Yes  
6. No 7. No 8. No 9. No 10. No

## HOW ARE YOU DOING?

---

You are in business when you buy a dairy calf. It will cost money. More money to feed it. Time to take care of it, too.

Save your time and money by knowing your business.

Find out how you are doing.

---

## DO YOU KNOW HOW TO BUY?

Check true sentences "Yes."

Check untrue sentences "No."

- |  | YES                      | NO                       |
|--|--------------------------|--------------------------|
| 1. A calf takes after its sire and dam.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. The dam of a calf is the father.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. The dam of a calf is the mother.  | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. The sire of a calf is the father.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. A 4-H Club member should pick a calf from the breed of cattle he or she likes best. | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. A 4-H Club project calf must be purebred.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. A calf is a good buy if it is from a grade bull.                                    | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. It pays to buy the cheapest calf you can find.                                      | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. A freemartin is a good buy.   | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. The calf costs more than the feed needed to raise it.                              | <input type="checkbox"/> | <input type="checkbox"/> |

The correct answers are on the back of this sheet.

If you answered them all right you're on your way. If not, find the answers in the leaflet and try again.

---





# MILK RECORD—4-H CLUB DAIRY COW PROJECT

Name or number of cow

....., 19....., 19....., 19.....

(Month) (Month) (Month)

Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk	Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk	Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk
1				1				1			
2				2				2			
3				3				3			
4				4				4			
5				5				5			
6				6				6			
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28				28				28			
29				29				29			
30				30				30			
31				31				31			
<b>Totals</b>				<b>Totals</b>				<b>Totals</b>			

Total weight of milk for month..... Total weight of milk for month..... Total weight of milk for month.....

Per cent butterfat ..... Per cent butterfat ..... Per cent butterfat .....

Number pounds butterfat\* ..... Number pounds butterfat\* ..... Number pounds butterfat\* .....

**\* Total pounds of milk multiplied by the per cent butterfat equals pounds of butterfat.**  
**Butterfat tests should be made each month.**  
 Make a composite sample of total day's milk by mixing a sample from each milking on the day the test is made.  
 Be sure milk is well stirred when sample is taken.





# MILK RECORD—4-H CLUB DAIRY COW PROJECT

Name or number of cow

(Month) \_\_\_\_\_, 19\_\_\_\_ (Month) \_\_\_\_\_, 19\_\_\_\_ (Month) \_\_\_\_\_, 19\_\_\_\_

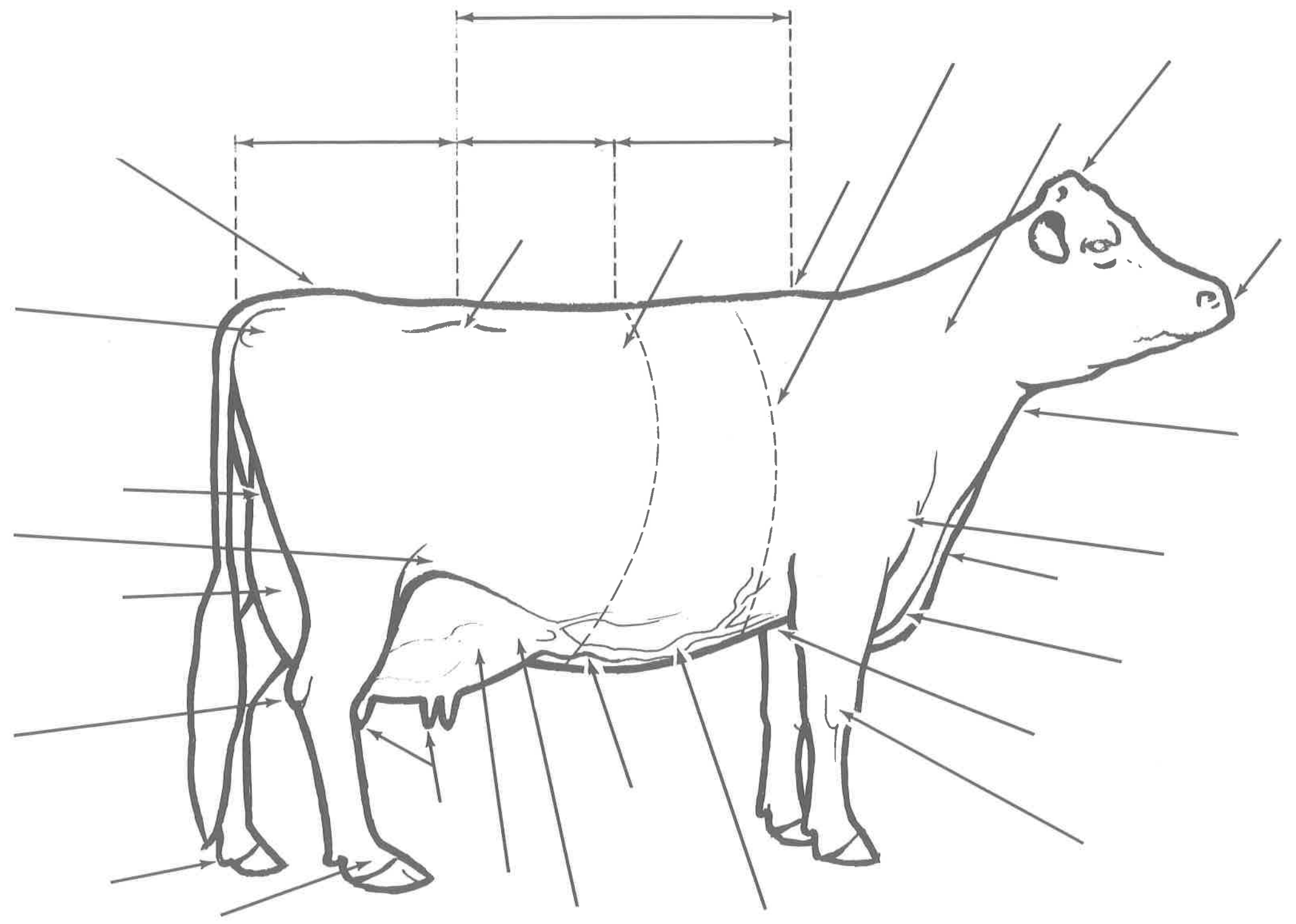
Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk	Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk	Day of month	Weight of morning milk	Weight of night milk	Total weight of day's milk
1				1				1			
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30				30				30			
31				31				31			
<b>Totals</b>				<b>Totals</b>				<b>Totals</b>			

Total weight of milk for month..... Total weight of milk for month..... Total weight of milk for month.....  
 Per cent butterfat ..... Per cent butterfat ..... Per cent butterfat .....  
 Number pounds butterfat\* ..... Number pounds butterfat\* ..... Number pounds butterfat\* .....

\* Total pounds of milk multiplied by the per cent butterfat equals pounds of butterfat.  
 Butterfat tests should be made each month.  
 Make a composite sample of total day's milk by mixing a sample from each milking on the day the test is made.  
 Be sure milk is well stirred when sample is taken.

- POLL** **MUZZLE** **THROAT**
- POINT OF SHOULDER**
- DEWLAP** **BRISKET**
- CHEST FLOOR**
- KNEE** **MILK WELLS**
- MAMMARY VEINS**
- FORE UDDER ATTACHMENT**
- FORE UDDER** **TEATS**
- PASTERN** **DEWCRAW**
- HOCK** **REAR UDDER**
- FLANK**
- REAR UDDER ATTACHMENT**
- PIN BONES** **TAIL HEAD**
- RUMP** **HIP** **LOIN**
- BARREL** **CHINE** **BACK**
- HEART GIRTH**
- WITHERS** **NECK**

Cut off on this line.



# DAIRY COW... PARTS IDENTIFICATION

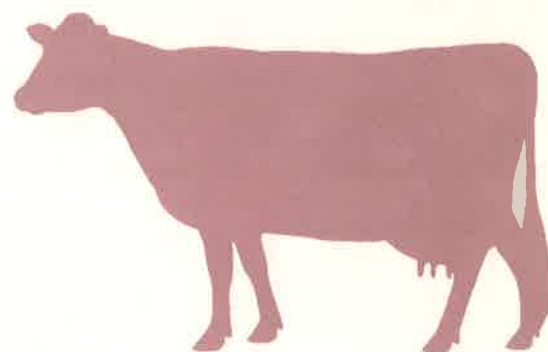
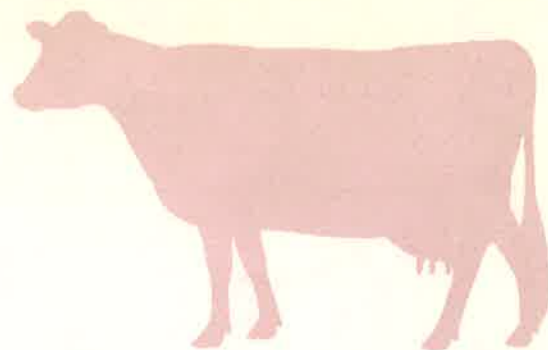
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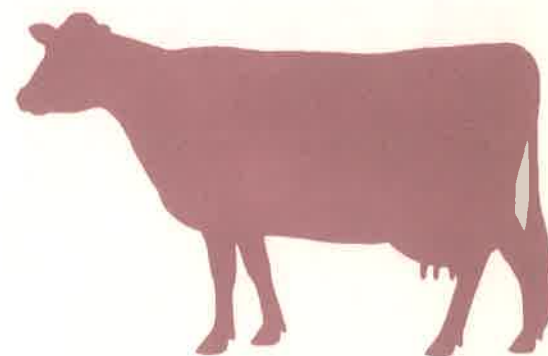
  
 Cooperative Extension  
 Division of Agricultural Sciences  
**UNIVERSITY OF CALIFORNIA**

*Animal Care Series:*

4-H OFFICE COPY



# **D**AIRY **CARE PRACTICES**



Dairy Workgroup  
University of California ♦ Cooperative Extension



# FOREWORD

*Dairy Care Practices* is one in a series of University of California publications addressing the issue of animal care relating to food production in California. This publication has been a joint project of University of California Cooperative Extension, dairy industry representatives, and members of the Dairy Workgroup.

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**The information in this publication is valid as reference material until June 30, 1996, unless revisions are necessary at an earlier date.**

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# INTRODUCTION

Proper animal care has evolved from research and decades of practical experience. Researchers continue to investigate and enhance animal care methods. The care and management of the dairy cow depend on age, location, lactation and pregnancy status, facilities, environment, health, and many other factors. The young calf has different needs for basic care than the dry or lactating cow. Thus, management must be aware of individual animal needs and provide for them. Proper care practices which provide for the animal's well-being may also be the most efficient in terms of production. If certain management practices conflict with the well-being of the animal, it will be to the producer's long-term advantage to adopt practices that put the animal's welfare ahead of short-term savings.

The goals of this publication are to explain why, when, and how specific practices are used in dairy production systems in California and not to set forth or suggest specific guidelines for production practices. This publication will help producers to evaluate husbandry procedures and offer production practices that are ethical and cost efficient. Variations from this publication's suggested care practices are acceptable. Continued research is essential to provide additional information about the basic needs of dairy cattle under different management systems. As new, scientifically based techniques and practices become available, management should adapt these methods into existing systems.

This publication includes a description of the dairy industry in California which documents several of the industry's unique characteristics. This is followed by **Management Components** with sections addressing specific phases of dairy production. Each section describes appropriate facilities, nutrition, and health care practices. A **Glossary**, **Bibliography**, and **Index** are included to assist the reader with terminology and sources of additional information.



# THE DAIRY INDUSTRY IN CALIFORNIA

California's dairy industry is influenced by two key factors. First, California's geographical isolation substantially limits the amount of milk that can flow into or out of the state. The Sierra Nevada Mountains and the unpopulated desert to the east of California, and the Pacific Ocean to the west, present geographical barriers to low-cost transportation of milk. Therefore, the California dairy industry has to produce enough fluid milk to meet the demands of the state's more than 30 million residents.

The second factor influencing the California dairy industry is its unique pricing system. Price is determined by a complex set of stabilization, marketing and pooling plans. This system is quite different from the federal milk marketing orders that affect milk price in most of the U.S.

California dairying also differs substantially from typical dairying areas in the East and Midwest. Drylot dairy farming was developed in Southern California in the 1920s and 1930s because of expensive land, and it predominates today. Dairy producers can milk 500 to 800 cows on a piece of land as small as 100 acres by housing cows in a drylot, handling waste properly, and purchasing all their feed ingredients. This allows for a more

intensive system of milk production than traditional pasture-based systems.

California cow numbers have increased about 2 percent per year in recent decades. Milk cows now account for about 12 percent of the total cow numbers in the U.S., compared with less than 5 percent in 1960. Average herd size in California is approximately 500 milk cows, compared with a national average of 60 milk cows.

Average milk production per cow in California is also one of the highest in the U.S. (along with Washington and New Mexico). In 1992, average milk production per cow exceeded 19,000 pounds compared with the national average of just over 15,000 pounds.

In 1992, California's 2,400 dairies marketed nearly 22 billion pounds of milk and were exceeded only by Wisconsin. Cash receipts from milk sales make dairying the largest agricultural industry in California. Of the 2,400 dairies in California, about 2,200 are Grade A and produce 98 percent of the milk. The remaining 2 percent is produced by Grade B dairies.

Southern California produces approximately 27 percent of the state's milk and an estimated 33 percent is

produced in the South Valley (the southern half of the San Joaquin Valley); the remainder is produced in Northern California (including the North Valley, North and South Bay areas and Del Norte-Humboldt region). In the past 20 years, production has shifted north as urban and environmental pressures in Southern California have sent southern dairies into the San Joaquin Valley. This has created a seasonal shortfall in meeting Southern California's fluid milk needs. Consequently, about 25 percent of Southern California's bulk raw milk needs are met from milk produced in the South Valley.

Finally, a prominent characteristic of dairying in California is the relatively low cost of milk production. There appear to be several reasons for this. The climate is favorable for dairying. In other parts of the U.S., harsh winter weather requires shelters for animals; these requirements are much less in California's mild winters. California summers are dry, in contrast to the humid conditions found in other parts of the U.S. Cows can be accommodated on hot California days

with simple shade structures and a water mister system. The combination of high temperature and humidity elsewhere tends to reduce milk production.

While costs of traditional feeds in California generally are slightly higher than elsewhere, there are many relatively inexpensive vegetable, fruit, nut, grain, and fiber by-products available for feeding to dairy cows. In addition, typical California-grown alfalfa is of much higher quality and availability than that grown in the East and Midwest because of the long growing season and controlled irrigation. Finally, the average California dairy is large enough to allow producers to capture economies of size and scale, thus reducing average per unit costs considerably.

The dairy industry in California developed because of the state's geographical location and marketing plan. It is comprised of intensive systems of management with high producing cows and low production costs. New technologies and advances through research continue to improve dairy care practices in California.

# MANAGEMENT COMPONENTS

## SECTION 1. CALF CARE FROM BIRTH TO WEANING

### INTRODUCTION

Heifer calves are raised as replacements for lactating cows and are essential to the successful future of the dairy. The greatest mortality and morbidity period for dairy cows is from birth to weaning. Management goals for the first 6 to 8 weeks of a calf's life should be to minimize disease and mortality by providing a suitable environment, establishing a quality nutritional program, and implementing a preventive health care plan.

### FACILITIES

Health and survival of the newborn calf depend on its care and environment. Designs for calf-rearing facilities range from complete barn enclosures to minimum shelters. A wide range of acceptable housing facilities exists within California. Calf housing should provide an environment that will minimize stress. Protection from heat, cold, wind, and rain is important. Adequate space, animal comfort, and proper ventilation are important in designing a facility. Facilities should be accessible for thorough cleaning and disinfecting on a regular basis to reduce the number of pathogens.

Placing the facility upwind from corrals and cow traffic decreases dust

problems. Housing calves between hay stacks, barns, or other large structures that impede air movement should be avoided. This is especially critical during the summer.

Facility features which are desirable but do not necessarily influence calf health include: design for labor efficiency, conservation of space, esthetics, and location for easy access by dairy personnel but not the public. Calf theft is common, and easy public access enhances rustling potential. Storage facilities for supplies, equipment, and sanitizing materials as well as access to refrigeration for milk and health care products are also important considerations in calf housing design. These features assist in developing and maintaining a successful calf raising program.

### Individual Pens

Individual pens separate calves and reduce the spread of communicable diseases and make it easier to observe behavior, feed consumption, and fecal and urine production. Changes in feed consumption and fecal consistency can be early indicators of sickness.

Many calves have been successfully raised in 2-foot by 4-foot expanded metal or slatted wood elevated pens. However, more hock,



leg, and joint problems may be associated with expanded metal floor pens than with other systems. The new plastic coated expanded metal may reduce some of these problems. Calves may suffer from cold stress in these pens because they provide little shelter from drafts and cold in the winter. Pneumonia may also be associated with these pens when they are placed over a flush system for cleaning. Recommended modifications of the elevated pen that double the pen size and include a bedding box filled with straw or other materials allow for more comfort and fewer leg and foot problems (University of California, Cooperative Extension Leaflet #2327).

### Hutches

Individual outside hutches predominate in California. Most are approximately 4-foot by 8-foot wooden hutches, although other materials are used. Slightly smaller individual hutches grouped in units of three are used in Southern California. Hutches are more labor intensive than elevated metal pens, but they allow for complete separation of unweaned calves. Because hutches rest on the ground, calves are better insulated from drafts than they are in elevated pens. Hutches can be moved and modified to adjust for temperature, sunlight, predominating winds, and direction of inclement weather. Hutches are easy to move or lift for cleaning. Fiberglass and polyethylene hutches are easier to sanitize than wooden hutches or metal pens, but these should be opaque to reduce heat from the sun.

### Cold Housing

Open-sided pole barns containing individual pens are referred to as "cold housing." Cold housing is adequate in most California conditions. Wind barriers, such as plywood or roll-up snow fencing material, can be used during the winter.

### Closed Housing

Closed housing consists of an enclosed barn containing individual pens. The most critical aspect of closed housing is adequate ventilation. Accumulation of moisture and manure gases, such as methane, carbon dioxide, hydrogen sulfide and ammonia, increases the potential for respiratory disease. Environmentally controlled closed housing is expensive to construct and operate and difficult to manage.

## **FEEDING AND NUTRITION**

### Colostrum Management

Colostrum is the milk produced by the cow prior to and during the first few days after calving. Colostrum obtained from the first milking after calving contains more protein, immunoglobulins, fat, minerals, and vitamins than milk produced later. Immunoglobulins, or proteins produced by the cow's immune system, are incorporated into the colostrum around the time of calving. For approximately one month after birth, calves depend on the immunoglobulins absorbed from colostrum for protection from infectious agents in their environment.

Proper selection, collection, storage, and feeding of colostrum are essential to a successful calf raising program.

The ability of the calf's intestine to absorb immunoglobulins declines within hours after birth. The newborn calf can absorb the large immunoglobulins as intact proteins which impart passive immunity. Within 24 hours after birth, intestinal closure occurs and intact proteins cannot be absorbed. Consequently, timing is important when feeding colostrum to ensure the absorption of intact immunoglobulins. Calves should be fed 2 to 4 quarts of high quality colostrum by bottle or esophageal tube within the first 24 hours of birth.

Continued feeding of colostrum from the first through the third or fourth day of life is important because immunoglobulins in colostrum vary greatly in type, size, and complexity. Each type reacts differently with the absorptive capacity of the intestinal wall. Although most immunoglobulins are absorbed only in the first few hours of the calf's life, others may be available for absorption up to 72 hours. The immunoglobulins also may have beneficial local effects in the lumen of the intestine. If there is an ample supply of colostrum, it should be mixed with whole milk and fed during the first 3 to 4 days of the newborn's life.

If a cow "leaks" milk from her udder prior to first milking, much of the colostrum is lost. The quality of remaining colostrum may be questionable. Colostrometers are

available to measure the specific gravity of colostrum, which should be greater than 1.106. This ensures that the calf receives the proper quantity of immunoglobulins.

Cows are normally vaccinated or immunized against specific diseases to produce a higher level of specific immunoglobulins in their colostrum. Such programs are best established with the assistance of a veterinarian.

If colostrum is not fed immediately, it should be frozen or refrigerated for later use. Freezing does not destroy the immunoglobulins or other nutrients in the colostrum, but does prevent bacterial growth and deterioration of the colostrum. Frozen colostrum can be thawed slowly in warm water or a microwave oven. Temperatures over 111°F can destroy the immunoglobulins. If colostrum is allowed to stand in a container, it should be gently stirred before feeding since the heavier and lighter particles may have separated. Once thawed, this colostrum can be fed to the calf following birth as an alternative to feeding the dam's colostrum.

### Calf Nutrition

Colostrum feeding usually ends by the fourth day, after which fresh whole milk or an excellent quality milk replacer is fed. Milk replacers are powdered products which contain predominately dry milk ingredients. These products are mixed with water and are formulated to provide adequate nutrition for the growing calf.

On some dairies, milk from medicated or "hospital" cows is fed to calves. Caution should be taken if calves destined for sale or slaughter are fed a medicated milk replacer or milk from cows treated with antibiotics. This will prevent problems associated with antibiotic residues in the meat of slaughtered calves. **All withdrawal times for medicated feed should be followed.**

Milk replacers with protein derived from dairy products are the most easily digested. Other protein sources (fish protein, cereal flours, unprocessed soy, or meat protein) are poorly digested. New milk replacers are being developed that contain vegetable protein with improved digestibility.

Generally, a milk replacer should contain a minimum of 20 percent crude protein and 20 percent fat on a dry matter basis. Crude fiber should be a maximum of 1 percent. The milk replacer should mix easily in water and stay in solution after mixing. Water used with milk replacers should be fresh and clean. Employees should take care to use the appropriate volume and temperature of water to ensure consistency when mixing milk replacers.

In addition to milk, dry concentrate feed (calf starter) and good quality hay can be offered free choice once the calf is a few days old. These feeds should be palatable, easily digested, and high in digestible protein.

The calf's diet should contain all known nutritional components necessary for normal growth and health relative to the calf's age, environment, and physiological requirements. Rations for calves between birth and weaning should meet the recommendations of the National Research Council's Nutrient Requirements for Dairy Cattle (1989) and allow body weight gains between 1.5 to 1.7 pounds per day.

### Water

Water is an essential nutrient. It is necessary for various metabolic activities, such as digestion, hydrolysis of carbohydrates and proteins, excretion of waste products, nutrient transport, lubrication of joints, electrolyte balance, and temperature control. Dairy calves initially receive most of their water from colostrum, milk, or milk replacer.

All calves should have access to clean, fresh water, usually provided by one pail per calf. The water should be free of particulate matter and low in salt and bacterial content. It should be free of pesticide residues and other toxic substances. Water troughs and pails should be cleaned thoroughly, and water should be changed when it becomes dirty. Changing the water frequently during the hot summer months provides the calf with cool, fresh drinking water and promotes water intake.

The amount of water consumed depends on the calf's age, amount and

type of feed consumed, ambient temperature, amount of exercise, and cleanliness and temperature of the water. Providing adequate water promotes the consumption of dry starter which is beneficial for weaning the calf. Calves up to 6 months of age drink 2 to 5 gallons per day.

## **HEALTH CARE AND MANAGEMENT**

### Umbilical Cord

If the umbilical cord is not severed immediately after birth, it can be cut 2 to 3 inches from the calf's body. The belly area (including the cord) should be dipped in a 2 to 7 percent tincture of iodine or other approved disinfectant. This will dry the cord and prevent pathogens from entering the calf's body through the cord.

### Sanitation

The calf should be born in a dry, clean environment. This clean and dry environment should be maintained regardless of the type of housing or bedding used. Accumulations of manure, urine, and spoiled feed can cause digestive and respiratory diseases. Even calves that have been fed ample colostrum may become ill if housed in an unsanitary environment.

Utensils used in feeding should be cleaned and sanitized after use. This will reduce the growth of pathogens and stimulate feed intake.

### Vaccination Programs

Most health problems can be minimized with proper management, including adequate nutrition, clean and dry housing, low-stress handling, and vaccination. The vaccination program depends on the disease problems prevalent within a given region and herd. Common diseases of calves are associated with the digestive and respiratory tracts. In most cases, vaccines are an essential part of a total health maintenance program that should be developed with the assistance of a veterinarian.

It is recommended that calves be vaccinated at least once prior to weaning for Infectious Bovine Rhinotracheitis (IBR), Bovine Respiratory Syncytial Virus (BRSV), and Bovine Viral Diarrhea (BVD). Vaccines must be used according to the manufacturer's specifications.

### Extra Teat Removal

Extra teats (more than four) can interfere with milking and may leak, which increases the possibility of mastitis. If desired, extra teat removal should be performed as soon as possible after birth to ensure a quick recovery. Precaution should be taken to avoid unnecessary pain or distress during the procedure and recovery.

### Dehorning

Animals are dehorned primarily to avoid injury to personnel or other animals, reduce feeder space

requirements, and increase handling ease. It is recommended dehorning be performed when calves are 2 to 10 weeks old. Older calves are more difficult to restrain and handle, and risk of blood loss, infection, and fly infestation increases.

A hot dehorning iron is the simplest and fastest way to kill the horn-producing cells. Caustic pastes and scoops are alternative methods, but these may cause the animal more prolonged discomfort. A local anesthetic is recommended for older animals.

Regardless of the dehorning method, a fly repellent should be sprayed on the dehorned area during fly season. Newly dehorned calves should be isolated from other calves to avoid licking. They should be kept out of the rain until the dehorned area is scabbed over and dry.

### Parasites

Some parasitic infections, such as coccidiosis, can cause serious health problems. It is recommended that a regular parasite control program be developed with a veterinarian's assistance. A clean environment is the best tool for combating parasite infections. As with vaccinations, products to control parasites should be used according to the manufacturer's specifications and, if necessary, under supervision of a veterinarian. **All guidelines for use and withdrawal times should be carefully followed.**

### Identification

Animal identification is critical for making important management decisions, such as feeding, selection, medicating, breeding, and culling; for official production testing systems; and for registering animals with purebred cattle organizations. Dairy cattle improvement depends on identifying and breeding animals with superior phenotypic and genotypic traits. This requires accurate records on each animal. Some breed associations require that each animal be tattooed before leaving its pen or hutch.

Animal identification may be either temporary or permanent. Temporary identification methods include ear tags, neckchains or straps, ankle straps, and marking paints. Permanent identification methods include ear tattoos, hide brands (hot iron brands, freeze brands, and liquid/chemical brands) and photographs.

The most popular type of animal identification is the plastic ear tag which is easily applied by trained personnel. An additional identification is the metal ear tag the veterinarian attaches following brucellosis vaccination. More recently, electronic identification systems are being developed that use a combination of "readers" or "decoders." Electronic identification systems interface well with computers and will gain popularity as computer systems in milking parlors are developed.

# MANAGEMENT COMPONENTS

## SECTION 2. HEIFER CARE FROM WEANING TO CALVING

### INTRODUCTION

Weaning involves the transition from a milk replacer or milk-based diet to a forage and/or concentrate diet. Calves should be offered a starter ration when they are approximately 1 week old, in addition to milk or milk replacer. Calves should be consuming 1 to 1 1/2 pounds of starter ration per day at weaning time, usually when they are 6 to 12 weeks old. The starter diet promotes rumen development.

Generally, calves should be weaned gradually. Often, it is preferable to wait a few days prior to moving the newly weaned calf from the calf rearing facility to a group pen of similarly aged calves.

Birth and weaning are the two most stressful periods in a calf's life. Management errors can often lead to increased health problems or reduced growth. Successful weaning programs minimize stress from crowding, competition with older calves, and weather.

The period between weaning and breeding is not a time of intensive management activity. Calves should be housed to minimize weather stress and allowed free choice to water. Rations should be balanced and fed so heifers reach a breeding weight of 750 to 800 pounds by 13 months of age, with a

body condition score between 3.0 and 3.5 on a 5-point scale where 1 is emaciated and 5 is obese. (All body weights and rate of gain goals are for Holsteins and should be adjusted for other breeds.)

Heifers are usually bred artificially. Artificial breeding is usually done in corrals with locking stanchions, or in a squeeze chute. Various estrous synchronization methods may be used to improve heat (estrus) detection.

Replacement heifers are fed mostly forages between breeding and calving (approximately 15 to 24 months of age). Housing should provide shelter from the elements and enough manger space for adequate feed consumption. A pre-calving body weight of 1,350 to 1,450 pounds, with a body condition score of 3.0 to 3.5 is desirable for Holstein heifers.

### FACILITIES

#### Housing Newly Weaned Calves

Calves should be weaned into small groups of animals, usually 5 to 12 calves per group. Newly weaned calves should not be mingled with older calves that are already established in the corrals. Pen size is recommended to be a minimum of 200 square feet per calf in open corrals,

with at least 18 inches of feed bunk space per animal. As little as 35 square feet per calf are provided in some functional intensive housing designs. There should be enough pens to hold about one month's production of weaned calves so each calf spends about a month in a small group.

An alternative system is to wean calves into "superhutches," which are portable pens providing a feeder, water trough, and shelter for 5 to 12 calves. Superhutches should provide 25 to 30 square feet per calf. They can be moved in a field or pasture as needed to provide calves with a clean surface.

All calf pens should be well-drained. While wet corrals cannot be avoided in rainy weather, they should drain so mud is minimal. Accumulated manure should be removed annually.

Pens for newly weaned calves should have 20 square feet of shade per animal. Shades should be oriented north to south and be high enough to allow sun to dry the area under them. Shades are often built on mounds to allow calves a dry place to rest in rainy weather. In the winter, dry bedding should be provided under shades. In some climates, permanent or temporary windbreaks may be desirable in winter (e.g., a pile of straw bales on the windward side of the pen).

Newly weaned calves often have difficulty reaching and consuming feed that is placed in front of stanchions. Calves may not be familiar with eating from ground level since

they are often fed starter rations from buckets in a hutch environment. They are also not accustomed to operating self-locking stanchions. The feed trough may be placed inside the pen.

Self-feeding grain tanks are not recommended for newly weaned calves. Soiled and wet grain may accumulate in the trough. If self-feeders are used, the feed in the troughs must be kept fresh to maintain adequate feed intake.

Adequate access to clean, fresh water is essential for optimum feed consumption and growth rates. Each pen should have a water trough that is small enough to allow water to remain fresh, but large enough so all calves have access to water when they require it. A trough that is at least 6 feet long and 4 to 5 inches deep is ideal. The water trough should be located for easy access by calves, in a shady area, and should have a drain plug for easy cleaning. It should be located so that overflow and drained water will not create a muddy or slippery area. This is usually accomplished by placing it on or near the concrete apron behind the stanchions. Water troughs should be cleaned regularly to remove fecal contamination, feed, algae, and other foreign matter.

Fences and gates should be secure. Loose rods, cables, and wires should be repaired promptly to avoid injury to calves and handlers. Gates should be arranged so calves can be sorted and easily moved from pen to pen.

### Housing Calves from the Second Month After Weaning to Breeding

Group size may be increased as calves age. If calves are weaned at 60 days of age, calves from 90 to 150 days may be housed in groups of 30. Groups of 60 to 100 may be suitable from 150 days to breeding. After 150 days, calves may be placed on pasture or housed in groups of 100 to 200. Calves should be sorted so that groups are uniform, with individual calves having no more than an approximate 10 percent weight variation from the mean of the group.

Once calves learn to eat through stanchions, stanchion line feeding can be used. Self-feeding tanks may also be used, provided they are monitored

frequently and cleaned as needed. Pen area and manger length requirements are outlined in Table 1.

Pens should be graded to prevent mud accumulation. Shade is recommended, especially in hot climates. Water troughs should be small enough to allow water to remain fresh but large enough to allow all animals access to water.

### **FEEDING AND NUTRITION**

Rations between weaning and calving should meet the National Research Council's Nutrient Requirement for Dairy Cattle (NRC, 1989). Growth rates exceeding those in the NRC are attainable.

Table 1. Space Requirements for Growing Heifers in Semi-Arid Climates

Age (months)	Stanchions/10 ft.	Shade ft <sup>2</sup> /head	Corral ft <sup>2</sup> /head
1.5 to 5	7	20	200
6 to 16	6	30	300
17 to 26	5	30	400

Source: Wiersma, F., W.T. Welchert and D.V. Armstrong. 1991. "Planning Ahead." The Dairyman 72:28.



### Newly Weaned Calf Nutrition

Milk feeding is usually discontinued 4 to 5 days before the calf is placed in a group pen, but only if the calf is eating at least 1 to 1 1/2 pounds of calf starter. Some dairy producers reduce milk feeding to once a day during the second month to encourage starter consumption. The presence of fresh clean water increases dry feed intake.

Newly weaned calves should be fed free-choice the same starter grain mix introduced before weaning. Rate of gain should be 1.5 to 1.8 pounds per day, with a maximum of 2.3 to prevent obesity. Calves may be fed at least 5 pounds of starter grain per day and have free-choice access to hay. Calf starter grain mix should contain 16 to 18 percent crude protein. Cottonseed products should be limited in the ration, since cottonseed contains gossypol, which is toxic to calves. Alfalfa hay for newly weaned calves should be soft stemmed, leafy, green, and palatable, with a crude protein of at least 20 percent and a total digestible nutrient content of at least 60 percent on a 100 percent dry matter basis.

### Feeding Programs from 30 Days Post Weaning to Breeding

Calves are usually fed hay and starter grain mix for about one month after weaning. Then calves may be fed a grower grain (14 percent crude protein) with forages. After 120 days of age, calves may be fed a total mixed ration (TMR), although some dairy

producers successfully feed a TMR earlier.

Requirements for growth after 180 days of age are met with high quality forages and minimal grain supplementation. Some supplementation may be necessary to attain growth rates of 1.5 to 1.8 pounds per day or more. Since nutrient requirements and feed intake vary with ingredient quality and weather changes, growth and body condition of heifers should be monitored and ration adjustments made as necessary. Salt or trace mineralized salt should be available in block or loose form if it is not included in the ration.

### Breeding to Calving Nutrition

Pregnant heifers are usually fed forage diets until a few weeks prior to calving. The goal is for Holstein heifers to calve at 24 months of age with a precalving body weight of 1,350 to 1,450 pounds, body condition of 3.0 to 3.5 on a scale of 1 to 5, and wither height of at least 52 inches. Growth rate should be 1.5 to 1.8 pounds per day. Salt may be withheld from periparturient heifers in herds where udder edema is a problem.

## **HEALTH CARE AND MANAGEMENT**

Health and well-being of heifers are largely determined by the adequacy of the facilities and management. When adequate facilities cannot be provided, heifer calves should be raised off the dairy. California heifers are often raised in specialized facilities,

sometimes out-of-state. This is acceptable as long as transportation practices are safe and humane.

Many calf disease problems have their origin in housing, management, or feeding deficiencies and weather stress. Severe weather stress can predispose calves to sickness even in the best programs.

#### Age of Weaning

Calves may be weaned from milk or milk replacer as early as 30 days of age and removed from hutches to group pens as early as 40 days. However, usually milk is discontinued at 45 to 55 days and calves removed from hutches at 55 to 65 days. While some producers leave calves in hutches and feed milk or milk replacer for up to 90 days, this can be counter-productive. Heavier calves require additional feed and water to allow for optimal growth. Also, larger calves produce more feces and urine, thus requiring supplemental bedding and waste removal to keep the environment clean and dry.

Since the birth rate of heifer calves is not constant, weaning age can vary. For example, if a large number of heifers are born and all hutches are full, some calves may require early weaning. If weaning pens are full, weaning may be delayed. This is acceptable if feeding programs are adjusted and housing facilities are kept clean and dry.

#### Breeding

Heifers may be bred artificially using the same techniques used for milking cows. They may be placed daily in stanchions for estrus (heat) detection with the aid of tail chalk or heatmount detectors. Heifers on pasture or in pens without stanchions may be heat detected by observation and then bred in a restraining chute. Heat detection may be facilitated by synchronizing the estrous cycle of heifers. This is accomplished with progesterone implants and/or prostaglandin injections.

After artificial insemination, heifers are often placed in groups with bulls to allow natural service of those animals that did not conceive with artificial insemination. Heifers not conceiving should be rectally palpated to determine reproductive tract abnormalities. Low birth weight sires should be used to minimize calving difficulties.

#### Identification and Records

Heifers usually are identified with plastic ear tags shortly after birth. They may be given numbers in a separate series from that used in the milking herd or receive a number that will follow them until they leave the herd. They are often retagged at the time of first calving with their permanent cow identification number.

It is useful to write the calf's birth date on the tag to allow easy evaluation of growth rate relative to herdmates. Heifers also receive a

metal brucellosis identification tag at the time of vaccination by a veterinarian. This provides a unique number that is often used for testing and regulatory purposes.

Extensive records are not usually kept on heifers but are encouraged. Births and deaths should be recorded. Most dairies with computer records initiate the animal's record at birth. Records of treatment of sick animals should be kept to avoid residues if an animal is slaughtered. Breeding dates, sire identification, and pregnancy diagnosis results are usually recorded in manual or computer records. Additional records that may be helpful are body condition scores, average daily gain, mastitis, or other health problems.

#### Vaccination Programs

Vaccinations recommended for heifer calves include Infectious Bovine Rhinotracheitis (IBR), Bovine Respiratory Syncytial Virus (BRSV), and Bovine Viral Diarrhea (BVD) at 4 to 6 months of age and again before breeding. They should be vaccinated with Leptospirosis bacterin at those times and again at pregnancy diagnosis. Clostridial vaccination may be beneficial in certain regions. Pregnant heifers may be vaccinated with J-5 *E. coli* bacterin before and at calving to help prevent coliform mastitis during lactation.

Heifer calves should be vaccinated for brucellosis between 4 and 8 months of age by a veterinarian. At this time they are tattooed in the

right ear and a permanent metal brucellosis vaccination identification or USDA series number tag is placed in the right ear.

#### Parasite and Fly Control

Flies breed readily in a moist, warm climate. Bedding and accumulated manure create an appropriate environment for fly breeding. Flies can be a significant stress on young calves. Control should be based on destruction of fly larva habitat by moving calf hutches frequently and removing accumulated bedding and manure.

Fly larvae and pupae also live in corral manure, especially in relatively undisturbed areas such as weedy fence lines, around water troughs, and behind stanchions. Some species of flies breed in piles of straw, hay, and other organic debris. Keeping a farm neat and clean and removing manure from under fences and behind stanchions can help reduce fly numbers. Insecticide dust bags in corrals help keep adult flies off of calves. Spraying corrals and haystacks with approved insecticides can temporarily reduce the number of adult flies. Chemical control of flies should not be the sole method for fly control. All labels should be reviewed before chemicals are used because there are various milk and meat withdrawal periods.

Heifers housed only in drylots do not require deworming. Heifers kept on pasture should be dewormed of

on a schedule that is designed for local climatic conditions. Purchased heifers of unknown origin should be dewormed at least once prior to calving.

#### Feed Additives

Infection with coccidian parasites can cause from little or no signs of illness to severe symptoms of profuse diarrhea. A coccidiostat (Decoquinat<sup>™</sup>, Lasalocid<sup>™</sup>, or Monensin<sup>™</sup>) should be fed as a supplement from weaning to 180 days of age and may be fed prior to weaning. Ionophores (Monensin<sup>™</sup> or Lasalocid<sup>™</sup>) also act as coccidiostats and may be fed to increase feed efficiency and weight gain. These products should be used only according to manufacturer's directions or under supervision of a veterinarian.

Oxytetracycline, chlortetracycline or chlortetracycline/sulfamethazine feed additives may be used to help prevent respiratory disease. These products are useful when calves are subjected to adverse weather and stress; before and during stressful management procedures such as vaccination, weaning, or dehorning; and to help contain outbreaks of respiratory disease. **Observe all withdrawal times to avoid residues in meat of slaughtered calves.**

#### Treatment Facilities

A hospital pen is recommended for the dairy to isolate and treat sick animals. Locking stanchions make observation and treatment easier. All calves should be observed daily and sick or injured calves treated promptly.



# MANAGEMENT COMPONENTS

## SECTION 3. CARE OF COWS AND CALVES DURING THE PERIPARTURIENT PERIOD

### INTRODUCTION

Proper care of the periparturient (around calving) cow and calf depends on facility design, management policy, training of personnel, health care programs, nutritional programs, and economics. Health and comfort of the cows and calves should be the main consideration. Calving is a relatively high risk event in terms of cow health. Preparation and care during this period will minimize sickness and death of the heifer, cow, and calf. Facilities should be designed to be safe, effective, and easily cleaned.

### FACILITIES

The main objectives of a calving facility are to minimize disease and stress to both the cow and calf. Convenience and employee working conditions are secondary considerations for these facilities. Properly managed sod pasture can be ideal calving areas during the summer, but they are often muddy during the winter. Additional time is required for frequent observation of cows calving in pastures.

Maternity and calving pens are an alternative to pasture calving. In large herds where calving is concentrated in a small area, sanitation is extremely important. Sanitary

conditions will minimize disease and stress to both the cow and calf. Pens should be designed for ease of cleaning on a regular basis. Well-grooved concrete floors are preferable so the pen area can be thoroughly washed while allowing for good traction and secure footing. Clean bedding should be provided in sufficient amounts for cow comfort. The calving facility should have a roof for shade in the summer and protection from rain in the winter and spring.

The calving facility should be located where it can be easily and frequently observed by the herd manager, milker, or other dairy personnel. Calving assistance can be provided when necessary. It is desirable to have a vacuum line and stopcock located in each pen to facilitate milking the fresh cow into a bucket to obtain colostrum. Access lanes to and from the facility are important for ease of cow movement and to segregate fresh cows from the milking herd.

A supply or utility room should be included to provide an area for safe and convenient storage of calving equipment and refrigeration of health care products and colostrum. A sink and running water for cleaning are also recommended in a well-planned calving facility.

### Close-up Cow (close to calving) Pens

Cows should be moved about two weeks prior to expected parturition to a "close-up" pen where they can be frequently observed. Cow density in the close-up pen should be about one-half of the density in lactating cow pens for hygienic purposes and to allow calving cows some space to segregate away from other cows. However, calving in the close-up pen should be avoided, if possible. It is desirable to have cows calve in a special maternity area. Cows should be moved to the maternity area when parturition is imminent.

### Maternity Area

Cows naturally isolate themselves to give birth. The maternity area should provide a secluded area for parturition. Clean pasture is a desirable environment for calving. Individual or small group pens are also suitable and are widely used in the western United States. There should be one clean maternity pen for each calving cow. The pens should provide at least 100 square feet per cow. The maternity area should be well-ventilated but not drafty. Supplemental lighting should be available 24 hours per day. The area should be clean, well-bedded, and free of unnecessary disturbances.

A locking stanchion should be convenient to the maternity area for cows requiring assistance at calving. One person should be able to move the cow to this area, restrain her and render obstetrical assistance. The

stanchion should be designed to prevent choking if the cow falls, i.e., the bottom of the stanchion should be close to the ground. The calving stanchion should have long gates which can be swung out of the way once the cow is restrained.

## **FEEDING AND NUTRITION**

Cows within 2 to 3 weeks of calving are normally fed as a separate group from other dry cows. A few pounds of a grain concentrate mix may be fed to these "close-up" cows in addition to roughages. This practice avoids a sudden shift from an all-roughage ration to a ration with a high proportion of concentrates which typically is fed to cows in early lactation. A sudden shift in ration ingredients and amounts following calving can cause gastrointestinal disturbances and predispose cows to other metabolic problems. For a 1,500 pound dry cow, 5 to 8 pounds daily of concentrate mix is recommended, depending on the body condition of the cow and the quality of the forage being fed. Cows with chronic mastitis, pendulous udders, a history of calving difficulty, and obese cows should not receive any grain concentrates before calving. Salt may be withheld from rations to reduce udder edema.

Rapid ration changes at calving should be avoided. If the postpartum cow is fed a total mixed ration, it is recommended to feed about five pounds of long-stemmed hay in the ration for at least 10 days after calving to stimulate feed intake. This will help prevent cows from refusing feed after

calving and the associated digestive malady of a displaced abomasum.

## HEALTH CARE AND MANAGEMENT

### Calving Assistance

About 25 to 30 percent of the heifers require assistance at first calving. Second or later lactation cows may require assistance about half as often. Assistance should not be given as long as the cow is making satisfactory calving progress. Heifers should be bred to low birth weight sires to decrease the incidence of dystocia (calving difficulty).

Personnel responsible for assisting calving cows and heifers should be trained in proper obstetrical procedures. Water for washing the cow and obstetrician, and clean calving equipment should be readily available. Hygiene and lubrication are critical to cow and calf health. The cow's perineal (around the vulva) area should be washed thoroughly and the tail tied to the cow to keep it out of the way. The obstetrician should avoid contamination of the reproductive tract as much as possible by making sure that hands, arms, and instruments are clean. If extra lubrication is required, a water soluble lubricant which is non-irritating to the reproductive tract is preferred.

Gentle traction applied to the calf minimizes damage to both the calf and the cow. No traction should be applied until the birth canal is open and the calf is in proper presentation for

delivery. The trained obstetrician applies traction when the cow is contracting and maintains gentle pressure between contractions, allowing the cow to rest. The person assisting should know his/her limits and call for veterinary assistance when needed. If a cesarean section is necessary, it is best to make the decision early before the cow, calf, and obstetrician are exhausted. Under no circumstances should motorized equipment be used to pull a calf.

### Postpartum Care of the Cow and Calf

After a cow gives birth and before she is released from the calving area, she should be examined to ascertain whether she has a second or third calf which has not yet been born. Cows that have twins or require assistance are more likely to retain the fetal membranes and/or develop a uterine infection. These cows should be observed more closely than cows that had normal, unassisted calvings. Cows normally expel the fetal membranes within 24 hours after calving.

Cows which become paralyzed during calving should be kept in a comfortable, well-bedded area with feed and water available. An early determination of the cause of paralysis will help determine if the cow should be culled or appropriate care administered to return her to health. A cow that is recumbent for more than 24 hours and unable to stand is not likely to recover.



In even the most hygienic calving areas, there are millions of microorganisms which will contaminate the cow's reproductive tract and the calf. Most cows and calves are able to overcome the contamination with no clinical problems. Cows requiring treatment with antibiotics should be

properly identified and treated according to a protocol designed by the herd veterinarian in conjunction with the dairy manager. The protocol should be designed to combat infection by likely microorganisms and **avoid any milk and meat residues.**

# MANAGEMENT COMPONENTS

## SECTION 4. LACTATING DAIRY COW CARE

### INTRODUCTION

The performance, health, and welfare of the lactating cow are reflections of the quality of care received at every stage of the production cycle. Performance depends on converting large quantities of feed into milk. Over the last 20 years, milk production has increased markedly due to improvements in genetics, nutrition, milking systems, facility design, health programs, and management. The welfare and care of the modern lactating cow are critical for the success of the dairy farm and providing the consumer with a quality product.

### FACILITIES

Proper facility design reduces stress and provides for comfort, proper nutrition, and health of the lactating cow. Temperatures under 40°F (4°C) may adversely affect lactating cows. Cold stress symptoms in dairy cattle are difficult to observe. The cow adapts to the stress of cold weather by increasing appetite and diverting energy from milk production to maintaining body heat. A heavier winter coat also helps the animal adapt. Rain and fog do not directly harm the cow. However, mud in corrals can increase the risk of mastitis; and frozen, crusty mud may injure the teats and udder. Also, cows traveling in

mud can increase the body maintenance nutritional requirements by 20 to 50 percent.

Cow productivity can also be decreased by temperatures over 75°F (24°C) and is aggravated by increasing humidity with high temperatures. The heat-stressed cow eats less, and subsequent performance is reduced. Stress signs, such as panting or standing in water, are not obvious until prolonged exposure to extreme temperatures or humidity occur. Heat stress is compounded when the temperature does not fall below 70°F (21°C) at night.

In the Western states, most dairy barns have open sides which provide for air flow. Barns that are not properly constructed and ventilated can accumulate heat, moisture, and gases. All of these factors can have detrimental effects on the cattle and the workers. A gap at the roof peak allows for the natural venting of warm air, moisture, and gases. Additional air movement can be provided by low-speed, high-volume fans.

Natural and electric lighting should be provided. Insufficient light in the barn makes it difficult for workers to observe and detect problems with the animals or the barn.

## Freestalls

A freestall is an individual cow bedding area where partitions orient the cow for comfort and sanitation. The typical dairy using a freestall barn does so to facilitate cow comfort and manure handling. The freestall gives the cow a dry and comfortable place to lie down for rest and rumination.

Freestall barns should have one stall for each lactating cow. Some farm operators may choose to provide more stalls to accommodate herd growth and to provide areas for subordinate animals to move away from more aggressive herd mates.

Freestalls should be designed and maintained for the average size of cattle using the facilities. Stalls that are too short or narrow make it difficult for the animal to rise. Some configurations may entrap the animal, resulting in injury or death. Stalls that are too long or wide allow the animal to move forward so that manure and urine are deposited within the stall and not in the alleyway. It is desirable to use excess bedding and devices which prevent the forward movement of the animal within the stall.

Animals will back into stalls unless the stalls are protected with so-called "back-out" devices. An arm or other device that contains a steel rod which moves upward as the cow rises is preferred. The rod or pipe must be heavy enough to encourage the cow to back out. Back-out control devices should be effective without creating a safety hazard. For example, the use of

a heavy wire cable stretched tightly over the row of stalls is effective but can be dangerous.

The choice of bedding material is influenced by cow comfort, sanitation, waste system, disease risk, cost, availability, and farm maintenance. Bedding material should be dry, drain well, and not contain or support the growth of bacterial pathogens at a level that increases the risk of udder infection. Bedding material should be soft and resilient and can range from gravel, to kiln-dried shavings, to beach sand, to dried manure. The accumulation of manure and urine, along with the gradual reduction in bedding material, results in an uneven, wet, microbe-laden depression that increases the risk of udder infection and the potential for the animal to step on her udder as she attempts to rise. Bedding material must be maintained by removing wet or soiled material in a timely manner and replacing it with fresh material. Tractor mounted devices for smoothing bedding in freestalls are effective in helping to maintain a level surface for cows to lie on.

## Loose Housing

Barns, shades, and corrals form the loose housing unit for the dairy cow. Ideal loose housing provides thermal and physical comfort and minimizes disease. Facility design and size depend on cow numbers, climate, and waste handling techniques.

Overcrowding often aggravates adverse conditions, such as excess

moisture, accumulation of manure, or reduced ventilation. This can predispose the cow to health problems, such as mastitis and pneumonia, and increase the number of insect pests. Overcrowding also affects cow behavior and may reduce access to feed, water, or resting areas for some subordinate animals.

The recommended loafing space for each cow in loose housing is 40 to 50 square feet of roofed area, in semi-arid conditions. The recommended space in unpaved earthen exercise corrals for groups of 100 cows is from 500 to 600 square feet per animal. Corral space may be reduced to 100 square feet on paved lots. Guidelines for housing in cooler climates are 20 to 30 square feet of roofed area per head for small breeds, and 30 to 40 square feet per head for large breeds. These considerations are equally important for waste removal and cow comfort.

In semi-arid conditions, loose housing roofs are often 10 to 12 feet wide, with similar height dimensions, and oriented north to south to allow the sun to dry the bedding. Wider-roofed structures should be oriented to allow for maximum natural air flow. Haystacks and other large objects should not be located where they impede air flow.

Bedding materials in dry weather can be dirt and dry manure, with weekly scraping to facilitate drying and reduce insect breeding areas. Straw or sand are preferred wet weather bedding materials. Wood shavings and sawdust can harbor high

numbers of mastitis pathogens if not kiln dried. Cotton stalks and gin trash are not permitted by the California Department of Food and Agriculture for bedding because of herbicide and pesticide residues.

To reduce slippage, surfaces in loose housing should include scarified concrete areas, 15 to 20 feet wide around water troughs, feed bunks, and entrances. It is advisable to score the surface perpendicular to cow traffic. Crisscross scoring gives better footing. Crushed rock is an alternative flooring; however, large pebbles which can bruise hoof tissue should be avoided.

Loose housing and corrals that are hard-surfaced generally require a 4 percent slope for proper drainage. Dirt lots may need a 4 percent slope or more, depending on soil type and rainfall. Surface pumping to remove storm water from a corral area can help reduce mud problems. However, corral scraping and excess manure removal before and after the rainy season are necessary.

Feed manger configuration, placement, and width per cow are factors in reducing stress and increasing comfort for dairy cows. Length of feeder space per cow affects time available to eat and amount of feed the bunk can hold. Cows are normally allowed 2 to 2 1/2 feet of manger per cow. Feed mangers must be cleaned regularly. This is particularly important with high moisture feeds during hot weather, since they can spoil if not consumed.

## FEEDING AND NUTRITION

Each cow should receive a balanced ration that meets the nutrient requirements outlined by the National Research Council's Nutrient Requirements for Dairy Cattle (1989). These nutrients include energy, protein, fiber, vitamins, and minerals. Many digestive disorders can be prevented by not feeding more than 60 to 65 percent of the diet as concentrate ingredients. Careful management of the body reserves of dairy cows is crucial to efficient production because body fat is a necessary and important energy source for lactation in the first few weeks after calving. However, excessive body fat before calving may be associated with increased metabolic diseases, calving problems, and culling. Body condition of cows and heifers should be evaluated regularly so feeding and management practices can be appropriately altered.

Commodity by-product feeds can economically be included in a dairy ration. Several factors need to be considered before a by-product is fed. Many by-product feedstuffs contain high moisture levels which are more prone to spoilage and will reduce palatability and quality of the ration. By-product feeds often vary in nutritive content. The vendor or manufacturer should provide a minimum guarantee on moisture and nutritive content and assurance that they are not contaminated by pesticide residues.

Toxins produced by molds are called mycotoxins. When mycotoxins are consumed in small amounts,

symptoms may be absent or be evidenced by reduced growth rate and appetite. Cows may abort and, occasionally, die. Feed quality should be maintained by suitable storage conditions. The feeding value of moldy or spoiled feed is related to the extent of spoilage and the age and type of animal to be fed.

To prevent the ingestion of small pieces of wire, baling wire should be carefully disposed. Magnets on the chutes of feed wagons will catch iron debris. Care should be taken to prevent nails and other metal from falling into feed mangers. Rumen magnets should be administered to cows. Magnets stay in the reticulum and collect metal fragments to prevent them from piercing the stomach wall.

### Water

Animals need fresh, clean drinking water for normal growth and production. A dairy cow consumes about five gallons of water per gallon of milk produced daily. Cows are sensitive to water problems because of the large volume they drink.

Excess nitrate, salt, bacteria, algae, or chemicals can decrease consumption of water and cause adverse health effects. The sources of these contaminants may include septic tanks and dairy wastes. Nitrate levels over 100 parts per million (ppm) and nitrite over 4 ppm may affect reproduction, number of abortions, growth rate, respiration, and death rates. Mature animals can tolerate fairly salty water, up to approximately

3000 milligrams per liter total dissolved salts. Animals in late gestation that consume excessive salt may experience severe udder edema at calving. Excess bacteria and algae generally do not cause health problems but may contribute to decreased water consumption. Water troughs should be cleaned regularly.

## **HEALTH CARE AND MANAGEMENT**

### General

Dairy cow management can contribute to many of the common and economically significant diseases. Common diseases include mastitis, reproductive tract infection, foot disease, and gastrointestinal problems. Prevention of disease requires a multi-disciplinary approach to management, including facilities design and operation, nutrition, waste management, animal selection, and veterinary medicine.

### Mastitis

Mastitis is the most common disease of the dairy cow. It results from a microbial infection of the udder, when bacteria gain entrance via the teat openings. Mastitis occurs in two forms: subclinical and clinical. The subclinical form is the most prevalent, and does not result in gross changes in the milk or clinical abnormalities in the animal. However, subclinical disease may become clinical, reduce milk yield, and is a common reason for an animal to

become unproductive and be culled prematurely.

In clinical mastitis, there are observable signs of dysfunction. These include swelling, redness, discomfort, and abnormal milk secretions. In some cases, systemic disease such as diarrhea, loss of appetite, dehydration, and even death occurs. Some severely affected animals may become non-ambulatory and will require special handling as described in Section 7, "Care and Handling of Animals Destined for Sale or Slaughter."

The emphasis on mastitis control is prevention. The key is through sanitation and proper management of non-infected and subclinically infected animals. Wet, manure laden areas in the lactating and dry cow pens and bedding areas, and poor sanitation during the milking process increase the risk of potentially severe clinical mastitis. Udders should be clean and dry when milked. Teats should be sprayed or dipped with disinfectant after milking.

### Foot Care

Healthy feet are important to the productive cow. Lameness will interfere with movement to the milking facility, obtaining feed and water, exhibiting estrus, and general health. Foot rot, a foot condition caused by a bacterial infection, can cause severe discomfort for the dairy animal and be a source of economic loss to the dairy. The first sign of foot rot is lameness that may involve one or more feet. In

acute cases, lameness is followed by swelling of the foot, spreading of the toes, and an abscess above the hoof. If not corrected, the infection will spread deeper and infect the joints, resulting in chronic arthritis.

Feet should be trimmed at regular intervals to protect the soft tissue of the foot. Management practices that help reduce hoof damage and avoid bruising will help reduce the incidence of foot rot. Proper drainage of all locations to minimize standing water also helps. Early detection and treatment will help minimize the incidence of foot disorders. Various types of foot bath solutions may be used to decrease the incidence of some foot diseases.

#### Machine Milking

Machines with a partial vacuum are used to remove milk from the udder. Vacuum levels between 12 to 14 inches of mercury are normal. Cows should have clean, dry udders before the milking machine is attached.

Pulsators, regulators, air hoses and liners require regular maintenance to function properly.

#### **HANDLING AND BEHAVIOR**

All lactating cows are moved and handled daily. The manner in which cattle are handled affects the safety and welfare of both the animal and personnel. Cows are gregarious and usually do not like to be isolated. They are also creatures of habit and do not easily adapt to new situations. From an early age, cattle should be handled quietly. Pain should not be used as a motivator.

Alarming sounds and force may be effective in the short term but can result in cow behavior that is erratic, explosive, and unpredictable. Hydraulic systems used for operating stalls and gates within the milking parlor should be fitted with over-pressure relief valves to assure the forces generated are not likely to injure the cattle.

# MANAGEMENT COMPONENTS

## SECTION 5. DRY COW CARE

### INTRODUCTION

A "dry" cow is a cow that is not producing milk (lactating). Daily milking is usually ceased abruptly after a dairy cow has been lactating for 10 to 12 months. The period of non-lactation (dry period) ideally begins 40 to 60 days prior to the next calving.

The dry period allows for the regeneration of milk secretory tissue in the udder. This process takes 3 to 4 weeks. Cows which are not given an adequate dry period will produce less milk in the subsequent lactation. A minimum dry period of 55 to 60 days after the first lactation, and 50 to 55 days after the second lactation is recommended. Older cows require a minimum of 40 to 50 days dry. A dry period of more than 70 days can contribute to obesity at calving. Obese cows are likely to have more calving difficulties and metabolic disorders.

### FACILITIES

Corral space, loafing area size, and protection from weather depends on cow numbers, climate, and waste management considerations. Dry cows are usually housed in groups. In unpaved earthen corrals under semi-arid conditions, approximately 500 to 600 square feet of loafing area and 40 to 50 square feet of shade per cow is recommended.

Cows should have a relatively clean, dry place to rest. Freestalls are becoming more common in California. These are individual pens which are open in the back so cows can freely enter and exit. If freestalls are used, there should be one stall per cow. If overcrowding is unavoidable at times, cows should not exceed freestalls by more than ten percent. Freestalls should allow 25 square feet per cow. Exercise pens should allow 100 to 200 square feet per cow. These recommendations are important for both waste removal and cow comfort.

Corrals should be free from standing and running water and graded to an approximate slope of 4 percent for drainage. Surfaces may be concrete or earthen. Corrals should be cleaned and scraped regularly. Clean, fresh drinking water must be accessible at all times. An overflow drain and a 10-foot concrete apron around the water tank is desirable. Shade should be provided in outside corrals. Trees and other natural objects can provide adequate shade, if available. Feeding locations can be designed to encourage adequate exercise.

### FEEDING AND NUTRITION

The feeding program during the early part of the dry period is aimed at stopping milk production. Eliminating grain concentrates, high-quality legume



forage, and corn silage from the ration reduces milk production. These feedstuffs can be replaced with lower-energy, high fiber forages such as grass or oat hay. Rations should meet National Research Council's Nutrient Requirements for Dairy Cows (1989).

Most nutrient requirements for dry dairy cows are much lower than for lactating cows. The feeding program during the dry period will vary depending upon the cow's calving date, but should maintain body condition, provide for growth of the fetus, and prepare for lactation. The energy requirements for the dry cow are lower than the lactating cow to keep dry cows from becoming too obese. Roughages, such as hay, should be used as the primary feedstuffs in dry cow rations and are usually the least expensive source of required nutrients. These fibrous feeds help maintain the strength of ruminal muscles and general rumen health.

Cows entering the dry period in proper body condition should be fed only roughages such as hay, pasture, greenchop, or silage until about three weeks before calving. Mineral supplementation may be necessary with some roughage sources. Dry cows should gain only a small amount (1 to 1.5 pounds per day) to allow for the growth of the fetus. Thin dry cows should be fed several pounds of a grain-concentrate mix daily in addition to the roughages to allow them to regain normal body condition. Obese cows have more calving and health problems and should not be over-fed during the dry period.

The total intake of calcium, phosphorus and potassium during the dry period is critical. These three minerals must be fed in amounts very close to the animal's needs to keep the gut absorption mechanisms activated. Excess quantities of any of these minerals will predispose the cow to milk fever (parturient paresis or periparturient hypocalcemia), downer cow syndrome, and other related problems. Milk fever will predispose the cow to other serious health problems such as dystocia, prolapsed uterus, retained placenta, uterine infections, and mastitis. High levels of salt (sodium chloride) can cause excess udder edema near calving.

The recommended feeding program for dry cows during the last two to three weeks before calving is described in Section 3, "Care of Cows During the Periparturient Period."

## **HEALTH CARE AND MANAGEMENT**

Cows recently turned dry should be carefully monitored until their udders no longer produce milk. Cows developing hard, swollen quarters should be milked out. This will remove the bacteria responsible for the inflammation. Approximately half of all new mastitis infections (infection of the mammary gland) occur in the dry period, peaking immediately after dry-off. Cows are particularly susceptible to new infections when milk is present in the udder. Therefore, it is important to keep dry cows in clean corrals.

Dry cow therapy is an important component of a mastitis control program because it reduces the number of persistent teat infections and new dry period infections. Dry cow therapy consists of infusing each quarter of the udder using a registered, Food and Drug Administration approved, long-lasting antibiotic at the end of a lactation. It is most beneficial if all four quarters undergo treatment at the end of each lactation. If the herd's level of contagious mastitis is low, the producer and the veterinarian may consider treating only cows that have a record of mastitis infection or high somatic cell counts.

Dry cow therapy has several advantages over treatment of mastitis during lactation. During the dry period, higher drug dosages can be used safely, the cure rate is much higher, and the risk of milk contamination from drug residues is reduced. A sterile individual syringe should always be used to avoid introducing infectious organisms into

the udder. **Always read and follow the manufacturer's label instructions. Observe withdrawal times to avoid residues in meat and milk.** Dip teats in a safe, effective teat dip before and after treatment. Immediately after administering dry treatments, the cow should be removed from the milking string. Cows should be observed for any complications for 7 to 10 days after treatment .

Other health treatments may be administered at this time, depending upon local disease problems and specific herd problems. Any necessary vaccinations should be scheduled well in advance of calving to allow the accumulation of desired immunoglobulins in the colostrum. Cows with diagnosed parasitic worm infections can also be treated during the dry period. Directions should be carefully followed on all vaccines and medicines, as certain modified live virus vaccines and some drugs can cause abortion.



# MANAGEMENT COMPONENTS

## SECTION 6. CARE OF THE DAIRY BULL

### INTRODUCTION

Bulls of various ages are common on dairies. Management practices including feeding and nutrition, health, and housing requirements for rearing bulls from birth to puberty are similar to those for raising heifers (see Section 1). Bulls may be housed with growing heifers of similar age prior to reaching puberty. After puberty, bulls are often raised in pens separate from the heifer pens.

Many dairies use bulls to breed cows that did not conceive to artificial insemination (AI) breeding, were not detected in heat and bred by AI, or aborted early in gestation. These bulls are referred to as 'clean-up bulls,' and they are housed with cows in group corrals. Clean-up bulls are often purchased from registered breeders to provide superior genetics for the herd. Some bulls used for natural service also may have had semen collected and distributed to other dairies for AI. The progeny from these matings allow evaluation of the bull based on the performance of his progeny. Bulls with superior genetic potential will then leave the dairy and enter a commercial AI organization. Bulls that are no longer needed for breeding are sold for meat.

### FACILITIES

Bulls are large, powerful animals and handlers should always be cautious. Most dairy producers sell bulls for slaughter when they become aggressive or too large. Consequently, most clean-up bulls are two years old or younger. Breeding bulls can be housed in open corrals or freestall barns with lactating cows. In some areas, pasture breeding is practiced and, thus, bulls remain on pasture. Corral fences and gates used for the milking herd are usually adequate for bulls. Likewise, shade, free stalls, water access, and feed bunk space requirements which are adequate for lactating cows are usually satisfactory for bulls.

Some bulls are housed on the dairy waiting for progeny performance information before acceptance into an AI program. Other bulls are sold specifically for natural service purposes. Bulls waiting for acceptance in AI programs often are housed in individual pens that provide adequate space for the bull to move freely (rise, stand, walk, and lie down) and provide protection from mud and rain.

The decision on construction material for pens must consider the size and strength of the bull. Many pens are constructed of pipe, although wood also is used. The pipe must be

stronger than pipe used for the lactating cows. Four-inch boiler pipe is considered adequate. The best designed facilities have pipes attached to metal posts which are set in concrete for strength. The interior should be safe for the animal and attendants, with no protruding pipes or sharp edges.

As a safety factor, the facility design should allow attendants to feed and water the animal without entering the bull pen. Bull pens should be designed to allow rapid escape for the attendants if they must enter the pen. Most pens are equipped with water bowls or troughs. The surface of the pen may be dirt or concrete. Dirt pens often provide better footing, but concrete pens are also suitable if adequate bedding is provided. Concrete surfaces should not be so smooth that footing or traction is impaired or so rough that hoof bruising occurs. The bull pens should be situated so bulls can be moved safely using existing walkways or alleys. Some pens include stanchions or head gates for restraint, although these are not a necessity.

### **FEEDING AND NUTRITION**

The feeding and nutrition program for growing bulls should meet requirements specified in the Nutrient Requirements of Dairy Cattle (NRC, 1989) publication. Most breeding age bulls, approximately 8 months and older, are housed with lactating cows and are fed the same diets as the lactating cows. Diets fed to lactating dairy cows (NRC, 1989) will meet or exceed the energy and nutrient

requirements of the growing bull. The lactating cow diet allows for maintenance and growth as well as the increase in activity associated with breeding. Long-term access to a lactating cow diet may cause calcification of soft tissues due to the high calcium intake. This is normally not a significant concern since most bulls do not remain on the dairy long enough to reach maturity. Mature bulls should be fed diets according to the NRC (1989) recommendations. All bulls should have free access to clean, fresh water.

### **HEALTH CARE AND MANAGEMENT**

#### Nose Rings

Some bulls have rings placed in their noses between 9 to 12 months old. A self-piercing, non-rusting metal ring is inserted through the nasal septum that separates the nostrils about one inch from the tip of the nose. The procedure can be conducted by trained dairy personnel or a veterinarian. Once the nose ring is inserted, a bull staff can be used by the attendant to help control the animal.

#### Preventative Health Program

A preventative health program for bulls should be established in consultation with the herd veterinarian. A health program should consider deworming, particularly for bulls on pasture, routine foot trimming, and vaccination programs. Bulls should be vaccinated for Infectious Bovine Rhinotracheitis (IBR), Bovine Viral

Diarrhea (BVD), Bovine Respiratory Syncytial Virus (BRSV), leptospirosis, and vibriosis. It is a good practice to have the herd veterinarian conduct a breeding soundness examination on dairies where facilities are adequate to safely restrain the bulls. This examination includes a microscopic examination of semen quality and a physical examination for signs of testicular or other reproductive abnormality. Bulls should also be tested for trichomoniasis at this time. Trichomoniasis and vibriosis are venereal diseases, and cows can be infected by the bull during breeding.

Most routine health care is similar to that provided to other animals on the dairy. Attendants should observe bulls for any health

problems, and appropriate action should be taken when necessary. Bulls can be aggressive, so they must be handled carefully. Finally, bulls must be treated in the same manner as other animals on the dairy to ensure that they remain productive and healthy.

#### Transportation

Transporting bulls requires care because of their size and temperament. Bulls are often transported individually due to their aggressive nature. Because of their size and weight, bulls that are incapable of standing require special attention. Transportation and the care of non-ambulatory or disabled animals is discussed in Section 7, and these suggestions apply to dairy bulls.



# MANAGEMENT COMPONENTS

## SECTION 7. CARE AND HANDLING OF ANIMALS DESTINED FOR SALE OR SLAUGHTER

### INTRODUCTION

Approximately one third of all lactating dairy cattle are culled, or removed from the herd, each year. Animals may be culled due to low milk production, infertility, temperament, lameness, and injury. Most culls are destined for slaughter. Some cull cows are purchased at auctions and relocated to other farms. Animals that die on the farm are transported to a rendering company. Some local ordinances require carcasses destined for rendering to be at least 100 feet from the roadside. It is advisable to use portable "blinds," hay bales, or other convenient screens to keep the carcasses from public view.

Regardless of whether animals are sold for meat or dairy purposes, handling and transportation should minimize animal trauma and stress. Transportation is inherently stressful. Efforts to reduce handling and transport time will reduce stress. Animal abuse during transportation provides no economic value and is not acceptable. Interim holding facilities, such as sale yards, should provide adequate feed, water, and shelter for the animals.

Drug use in animals destined for slaughter must conform to the legal meat and milk withdrawal times

specified on the product label or by veterinarian's instructions. The use of animal medications by producers in a manner inconsistent with the manufacturer's or veterinarian's instructions is prohibited by law. Violative levels of antibiotic residues in the meat and other tissues in slaughter animals will result in condemnation of the carcass and penalties for the livestock owner.

### ANIMAL HANDLING

Dairy cattle are generally docile, however, bulls are extremely strong and can be aggressive. Handling bulls and cows in a manner that excites or provokes them can result in serious harm to the animal and personnel. Cows with newborn calves also can be aggressive and should be handled with caution.

Cattle have panoramic vision, except for an area directly behind them. Therefore, the animal should be approached from a direction other than the rear. If there is no alternative, a low, quiet voice will indicate to the animal that someone is approaching and will help prevent startling. Animal handling that is abusive only tends to make the animal more excited and prone to harming itself or others. Extremely aroused animals can have elevated levels of stress hormones,



such as catecholamines and cortisol, which may reduce the quality of the meat or increase susceptibility to disease.

Moving animals to and from holding pens and loading ramps should be done with a minimum of excitement and noise. Animals should not be forced to move faster than a slow walk. Electric prods, whips, slappers, and other devices should be utilized only when necessary by trained personnel. Devices that can cause injury, such as sharp sticks, should be avoided. Properly designed facilities provide for ease of movement, safety for personnel, and minimize stress.

Bull calves are often sold and removed from the dairy within one day of age to be raised elsewhere for veal or beef purposes. These calves should be dry, have iodine or other approved disinfectant applied to the navel, and should receive sufficient colostrum before leaving the dairy. Humane care in handling and transport is critical since these calves have limited ability for self-care.

## **ANIMAL TRANSPORTATION**

Persons involved in loading, transporting, and unloading cattle should be trained in techniques that avoid stressing or traumatizing the animals. The manner in which the animals are handled, the duration of transport, climatic conditions, and the design of containment all may be sources of stress for cattle. Trips should be planned to minimize transport time. Hot climates with

intense solar radiation add significantly to animal stress. Precautions, such as shade, ventilation, and availability of cool water should be considered when handling and transporting animals on hot days. Animals in late gestation should be transported with extreme care to protect cow and fetus. Truck drivers should avoid erratic speed and direction changes to prevent animals from colliding and falling. Vehicles should be equipped with mirrors or inspection ports for load observation. Exhaust fumes should not enter the trailers.

The animal container should be designed for animal transport and be free of obstacles that could cause an animal to fall or otherwise inflict injury. Doors, gates, and passageways should be designed to allow ease of passage and maintained to avoid hazards. Proper ventilation, especially in hot weather, and the avoidance of wind chill are essential. Truck floor space should be allotted so that all animals can stand in a normal position. During long trips, the animals should be checked for signs of distress within the first 20 miles and periodically thereafter. Long trips should be planned to allow for ample food and water. Lactating cows should be milked at 12-hour intervals.

## **NON-AMBULATORY ANIMALS**

A non-ambulatory animal is one which is incapable of standing or walking due to sickness or injury. These animals are often referred to as "downers" or "disabled" animals.

Some non-ambulatory animals regain mobility with appropriate care. Others will not respond to treatment and will require special handling to move them to a processing facility. Some local ordinances prohibit movement of non-ambulatory animals.

Every farm will occasionally have to handle animals that are acutely diseased or injured and unable to walk, eat, or drink. Handling sick and non-ambulatory animals must be done with a minimum of force to move and manipulate the animal. Non-ambulatory animals should be protected from direct sunlight, rain, and extreme temperatures. Feeding, watering, and milking the animal will be necessary.

Handling non-ambulatory animals requires special equipment to assure the animal is unharmed and to lift the weight of the animal. Devices and equipment, such as sleds, are available to safely lift and carry non-ambulatory animals to another location on the farm or to a truck for transport. The use of chains and ropes attached to tractors, trucks, or other heavy equipment to lift or drag animals should be for the shortest possible distance, and padding is necessary where a chain or cable passes over the animal's body. Without these precautions, major trauma may result.

If the proper equipment is not available, the animal should not be moved. The proper equipment should be obtained or the animal should be humanely euthanized. Diseased or non-ambulatory animals destined for a rendering plant, must be humanely

euthanized prior to pickup. (For more detailed information see Livestock Conservation Institute, 1992.)

### **SALE YARDS AND SLAUGHTERHOUSE (ABATTOIR) HANDLING**

Sale yards and slaughterhouses are an essential part of the dairy business. Many animals in a sale yard are destined for slaughter; others are sold singly or in groups for transport to other dairies. The sale yard serves as a gathering place for the marketing of animals.

Cattle destined for sale or slaughter should not be treated any differently than animals at the dairy. The care of animals destined for slaughter or sale is vital for the quality of meat or future productivity at the farm destination. All animals should be provided with clean, accessible water. Sick and diseased animals must not be placed in dead animal holding areas. These terminally ill or injured animals should be humanely euthanized.

Flagrant animal abuse is not condoned by society and is prohibited by California laws. Abusive handling is costly for the producer. Bruises from abuse or dragging a non-ambulatory animal can reduce the carcass value up to 50 percent. Educating cattle handlers in proper animal handling practices is essential. Knowledge of basic cattle behavior including the animal's senses of sight, hearing, and smell will facilitate proper handling.



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# GLOSSARY

Antibiotic	A therapeutic product produced by living organisms, such as molds, which destroys or inhibits the growth of other microorganisms, especially bacteria.
Artificial Insemination	Placing frozen semen which has been thawed in the uterus of a female bovine in estrus.
Attenuated	Process used in vaccine production to modify organisms to induce immunity without causing disease.
Brucellosis	Disease of cattle causing abortion in females and undulant fever in people. Subject to a federal/state eradication program requiring vaccination of all breeding females by an accredited veterinarian.
Bull	Uncastrated bovine male of any age.
Calf	Young bovine animal of either sex under a year of age.
Castration	Removal of the testicles.
Close-up Cow	A pregnant cow within 2 to 3 weeks of calving.
Coccidia	Microscopic single-celled animal parasites that cause diarrhea and other diseases.
Colostrum	Milk produced by a cow prior to and during the first milking after calving which contains maternal immunoglobulins.
Cow	A sexually mature female bovine animal which has produced a calf.
Cull	To remove less desirable animals from the breeding herd.
Cycle	Length of time from one estrus period to the next; averages 21 days in bovine.
Dam	Female parent.
Dehorning	Procedure to remove horn or terminate horn growth permanently.
Downer	Animal which cannot stand or walk due to sickness or injury.
Dry (cow)	Nonlactating pregnant female bovine that has completed a lactation.
Drying-off	End of lactation when milking is stopped and udder is allowed time to regenerate milk-producing tissue.
Dystocia	Difficult birth.

<i>E. coli</i>	Bacterium causing mastitis in cows and diarrhea in calves.
Edema	Excessive accumulation of watery fluids in cells, tissues or cavities.
Estrous cycle	Reproductive cycle of the nonpregnant cow or heifer.
Estrus	The period of mating activity in the cow; same as heat.
Forage	Fibrous feedstuffs harvested from plant sources (e.g., hay, silage); roughage.
Fresh	A cow or heifer that has recently given birth or "freshened."
Gestation	The time period from conception to calving.
Gossypol	A toxic compound contained in cottonseed.
Heat detection	Identification of females in heat for artificial insemination.
Heifer	A female bovine that has not produced a calf; sometimes a cow in first lactation.
Hutch	Small portable shelter for single calf.
Lactation	The period between calving and drying off when a cow produces milk.
Mastitis	Inflammation of the mammary gland.
Milk fever	See parturient paresis.
Morbidity	Incidence of disease; morbidity rate is the proportion or percentage of individuals in a group that become ill during a specified time.
Mortality rate	Proportion or percentage of individuals that die from a disease during a specified time, usually 1 year.
Mycotoxin	Poisons in feed caused by molds.
Natural Service	Breeding of a cow utilizing a bull rather than artificial insemination.
Necropsy	Autopsy performed on animals.
Ovary	The female reproductive gland in which the eggs are formed and progesterone and estrogenic hormones are produced.
Parasite	An organism that lives a portion of its life cycle in or on a host animal.
Parturient paresis	Partial paralysis that occurs at or near time of giving birth to young and beginning lactation; commonly called milk fever.
Parturition	The process of giving birth, calving.

Pasteurization	The process of heating milk to 161°F and holding it at that temperature for 15 seconds to destroy microorganisms that cause disease or spoilage of products.
Pathogen	Biologic agent--i.e., bacteria, virus, protozoa, nematode--which produces disease or illness.
Periparturient hypocalcemia	Low serum calcium associated with calving which can result in loss of motor function. (See also parturient paresis.)
Postpartum	Following birth.
Protozoa	Single-celled microscopic animals.
Roughage	Feeds with high fiber and low energy content.
Rumen	The large fermentation compartment of the ruminant animal's stomach in which bacteria and protozoa break down fibrous plant material and synthesize essential proteins and vitamins.
Rumination	Regurgitation and chewing of feed from rumen; cud chewing.
Shade	Structures in corrals designed to provide shelter from sun.
Stanchion	Devices that close around the neck of cattle behind the head; used to restrain animals for heat detection, examination, breeding, treatment, etc.
Stress	An unusual or abnormal influence causing a change in an animal's function, structure, or behavior.
Total Mixed Ration (TMR)	Complete ration consisting of concentrate, roughage, and supplements necessary to meet the daily nutritional requirements of the cow.
Vaccine	Suspension of attenuated or killed microbes or toxins administered to induce active immunity.
Whole Milk	Milk as collected from the cow, without further processing.





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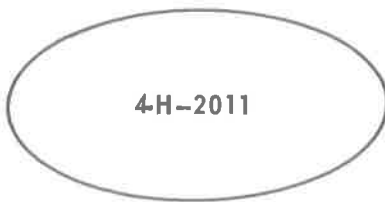




**THE 4-H LEADERS'**  
**DAIRY**  
**PROJECT**  
**MANUAL**

Division of Agricultural Sciences  
**UNIVERSITY OF CALIFORNIA**

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# THE 4-H LEADERS' DAIRY PROJECT MANUAL FOR THE LEADER

Congratulations! You are now a volunteer leader in the California 4-H program. As an animal science leader, you'll want to

- Help 4-H members learn the principles of animal science.
- Plan at least four informative project meetings during the 4-H year. Each of the units in this series has ideas of things members can learn, do, and explore.
- Make home visits to work with members and their parents when the need arises or when questions can't be adequately answered in project meetings.

## OBJECTIVES

The animal science projects offer boys and girls opportunities and challenges. Although some members can't participate in all project phases, they'll want to fulfill the objectives of

- Work (things to do)
- Study (things to learn)
- Personal improvement (things to become)
- Leadership (ways to help others)
- Service (things to do for others)

## PHASES OF THE DAIRY PROJECT

Members may select, own and care for one or more dairy animals. They may start with a calf from several days to several weeks old and sell it as a bred heifer or keep it for a milk cow. Or they may buy a bred heifer and keep it for milk or a lactating cow.

Rural, nonfarm, or urban members may also jointly own an animal, or they may manage, feed, and keep records on one or more animals that belong to someone else. They can do the project individually or as a group, such as in a 4-H farm situation. Jointly owned or nonowned animals can't be shown at fairs.

## AIDS FOR LEADERS

There are many teaching aids available to help you. Leader materials include printed literature for 14 units; a slide set with cassette recording for many of the 14 units; three-dimensional models of animal species; educational games; and other aids. You can obtain these materials from your county's Cooperative Extension 4-H office. Ask resource people in your community, such as dairies, bankers, and others, to assist you.

Please note that you don't need to cover all 14 units in 1 year. Discuss the units with your members and cover only those units that meet their immediate needs. Remember that 4-H'ers learn by doing, but someone must show the way—that's your responsibility as an animal science leader.

## THE PROJECT MEETING

Inform members and their parents in advance of the project meeting date, time, and place. An established day, such as the third Saturday of the month, often avoids confusion. Keep meetings fairly short; about 1½ hours is good. As part of each meeting, include pertinent information (such as demonstration of a specific topic), group discussion, record book reviews and helps, summary of the meeting, and recreation.

You may find it helpful to make detailed plans for each project meeting. You may want to use a form similar to the one shown. (Project Planning, 4-H-8026, also contains suggestions for planning meetings; it is available at your county 4-H office.) Make your plans after discussion with members and those who are to assist you with project meetings, such as junior and teen leaders or resource leaders. Remember that plans must be flexible; it is important to cover what the members want and need to learn.



**Sample Meeting Plan**

Date \_\_\_\_\_ Time \_\_\_\_\_

Place \_\_\_\_\_

Project phase \_\_\_\_\_

Topic (or skill to be taught) \_\_\_\_\_

What are members to accomplish? \_\_\_\_\_

**Supplies and Equipment**

What Needed?		Who Brings?	
Things to do	Who's in charge?	Who's to do it?	
<u>Example:</u> Introductory remarks Demonstration of topic Discussion by group Group participation Record review and help Judging or other activity Summary Recreation			

What can members do before next meeting? \_\_\_\_\_

What is topic of next meeting? \_\_\_\_\_

What supplies do members need to bring to next meeting? \_\_\_\_\_

\_\_\_\_\_

## OVERVIEW

The 4-H dairy project is a part of the animal science program. It is designed for boys and girls who are keenly interested in livestock, specifically large animals.

In this project, members may raise a heifer calf, breed it and sell it just before freshening as a bred heifer, or they may keep it to milk. Or they may buy a bred heifer and keep it to milk. Or they may participate in some phase of a jointly owned or nonowned project. The jointly owned or nonowned project may or may not involve working with a live animal. This phase is particularly suited to urban and other nonfarm members who may not have the resources necessary for keeping an animal.

If a member wants to own an animal, both he and his parents need to learn what to expect. You can give them much helpful advice.

In general it's best if a member starts with a heifer calf approximately four to six months old. Newly dropped calves require special feeding with milk or milk replacer and are more susceptible to disease. A member needs adequate capital to buy the calf and to feed it properly. Pasture is necessary for economical growth of a heifer. The member should decide before he buys an animal what he plans to do with it. Your role as a leader, then, is to advise the member and his parents about financing, animal selection, management and marketing. You'll want to discuss such topics as

- The amount of experience the member has had with dairy procedures.
- The type of facilities needed—a dairy project requires pasture, a barn or shed, hay and grain. A very young calf requires milk or a milk replacer. If the member plans to keep the animal for milking he needs to consider how he is going to milk—hand, machine, in a dairy—and how he is going to use the milk—at home or marketed through a dairy.
- The amount of money and patience needed. Establishing a dairy herd takes time and money and a place to market the milk.
- Whether the member wants a calf and, if so, what age, or an open heifer or a bred

heifer. If your county has a 4-H dairy heifer replacement program, find out the requirements and discuss them with the member.

- Whether he wants a grade or registered heifer.
- Which breed he wants to buy.

The jointly owned or nonowned project offers many different types of member involvement. Members interested in learning about animal nutrition, physiology, genetics, and health can participate in the jointly owned phase. For example, two or more members might jointly own, feed, and manage an animal as well as keep daily records about growth, health, and financing. The animal could be housed on a 4-H farm. Once the project is completed, the animal could be sold in a dairy heifer replacement sale or on the open market with the assets equally divided and recorded.

Or a member can manage some phase of the operation for a dairyman emphasizing the selection, feeding, breeding, keeping of production records and pedigrees, or calf management of the project. The member must be able to work at the project on a day-to-day basis, just as the dairyman must.

Some members may not be able to have an animal at home, on a 4-H farm, or even manage a herd for someone else. However, these young people may wish to learn about dairy husbandry, the role of the animal in the environment, and human nutrition as it relates to milk products. You can give these 4-H'ers guidance in the units on Marketing, Extra Activities, Group Activities, Public Relations, Science, and the California Dairy Industry.

The dairy project can help a member to

- Accept responsibility
- Develop a feeling for living things
- Learn patience
- Make decisions

You as a leader can work with members in all three phases of the dairy project to "Make the Best Better".

# SELECTION

Selecting the right animal for a dairy project is just as important as giving the animal proper feed and care. A member's success depends, to a large degree, on the quality of the animal he or she chooses. Base animal selection on the project phase chosen—calf, bred heifer, or lactating cow.

## Things Members Can Learn

- To learn the different breeds of dairy cattle and their origin
- To know the nomenclature for the live animal
- To understand a glossary of terms related to dairy animals
- To learn what it costs to feed an animal
- To review show base dates for breeding projects and to apply these when purchasing or breeding animals
- To be aware of animal health and soundness and be able to relate these factors to animals considered for purchase
- To review production records and pedigrees

## Things Members Can Do

- Observe demonstrations illustrating desirable-type animals
- Participate in judging events to improve type concept
- Attend livestock sales (stockyards, auctions, breed sales) to observe animal marketing methods
- Visit dairies to see animals of various sizes and compare to member's project animal
- Prepare facilities for a dairy science project

## KEY INFORMATION

### When Selecting A Dairy Project

- Decide whether member should buy a registered or grade heifer or cow, but always buy a high-quality animal.
- If registered, be certain the animal is registered in member's name.
- Select from herds with production records—select animals with high produc-

tion or from dams that have high production.

### When Selecting A Dairy Project Heifer Look For

- Straight top (back)
- Deep body, full in heart girth
- Wide rump and chest floor
- Sharp over the shoulders
- Straight, strong legs
- Feminine head and neck
- Udder with large capacity, strongly attached in front and rear
- Level udder floor

**Conformation.** Select an animal that has good size for its age. It needs to be well proportioned, providing ample body capacity, strength and vigor but not coarse.

**Age and Size.** Age is *most* important when selecting breeding animals that are to be shown at fairs and expositions. Study the current premium list if you are going to show at fairs. The base dates for dairy animals up to two years of age are January 1 and July 1. Select a calf with desirable conformation and dairy character that has a birthday as soon after January 1 or July 1 as possible. If you have several animals, select them for different classes to fill as many individual age classes as you can. Don't take along a "scrub" just to fill a class.

For lactating cows of all ages, try to select one to show about 3 to 6 weeks after calving so that she will be near her peak of production during the fair. Grade or purebred cattle can be shown at fairs. If you live on a commercial dairy farm you are encouraged to start with registered animals.

**Breed.** The principal breeds of dairy cows listed in order of popularity in California are Holstein, Jersey, Guernsey, Brown Swiss, Ayrshire and Milking Shorthorn. Most of the dairy cattle in California are Holsteins. Jersey and Guernsey cattle are quite popular in northwest California. Holsteins on the average are the largest dairy animals producing the most milk and the lowest butterfat percentage

in the milk. Jerseys are the smallest dairy animals and they produce the least milk with the highest percentage of butterfat.

**Health.** Healthy calves usually have bright eyes and are alert, are thrifty and show quality in the hair coat, and are free of disease and parasites.

**Price.** Don't pay an excessive price for breeding animals. If a member has top pick of a group, he should expect to pay a premium for getting above-average quality. Dairy animals are usually sold by the head. Cull dairy animals or dairy steers are usually sold by the pound.

## REFERENCES

### Slides and Filmstrips

1. *Judging Dairy Cattle*, No. 76/139 (slide set with cassette). Order from county 4-H office.

### Teaching Aids

Weight tape. Order from county 4-H office.

### Printed Material

Breed associations have material on selection of animals from their breed.

### Other Helps

Resource people such as dairymen, herdsmen, instructors, and others.

# PURCHASING AND FINANCING

There are several methods of starting the dairy project depending on the amount of funds available. The member and his or her parents must be aware of the cost of feeding dairy animals. The initial cost is only a small part of the total dairy project. The member must decide when the animal will be sold or whether he or she plans to milk the animal after freshening. Bulls *are not* recommended for this project.

There are several sources of funds: 1) his or her own, 2) loan from parents, 3) loan from a bank or other lender. The amount needed will depend on the age of the animal and whether it is a purebred or grade animal. The project can be a long one which will require a large loan if the cost of feed is to be included.

### Things Members Can Learn

- The meaning of collateral, principal, interest, loan balance, depreciation, operating expenses, gross and net income
- To keep accurate 4-H financial records
- To figure per-day cost of feeding animal
- The difference between long- and short-term credit

- The best time to purchase feed to save money
- To know what a financial statement is
- To understand the term "cash flow"

### Things Members Can Do

- Visit a local bank or Production Credit Association to learn about dairy financing
- Visit a local dairyman to see how he uses credit
- Visit a creamery to see how milk is paid for
- Prepare a financial statement
- Work out a "cash flow" problem
- Prepare definite written plan for use when applying for a loan. Be sure to understand loan repayment schedule

## KEY INFORMATION

### Types of Projects to Buy

- Grade heifer calf or yearling
- Purebred heifer calf or yearling
- Grade replacement heifer if county provides this special program

- Bred heifer (grade or purebred) if member can milk them when they freshen
- Milking cows (grade or purebred) if member has facilities to milk them and a market for the milk

**Cash Flow.** The money available to meet current operating expenses plus an amount to meet current capital notes and capital expenses.

**Depreciation.** Decline in value of an asset (cattle, buildings, equipment) due to age, wear, obsolescence or inadequacy.

**Financial Statement.** A list of assets (what one owns) and their value along with a list of debts owed, both secured and unsecured.

**Secured Debts.** Items on which money is owed. Lender has legal right to those items or other items depending on note.

**Short Term Credit.** Loans normally 5 years or less; however, some may go to 7 years depending on life of item.

**Long Term Credit.** Any loan over the 5 or 7 year period. May be 20 to 30 years on real estate.

### ESTIMATED COST OF FEEDING A DAIRY HEIFER

Cost of animal \$ \_\_\_\_\_

**First four months**

400 lbs. milk or milk replacer	@ _____ ¢/lb.	= \$ _____
225 lbs. calf starter	@ _____ ¢/lb.	= \$ _____
25 lbs. growing mixture	@ _____ ¢/lb.	= \$ _____
125 lbs. alfalfa hay	@ _____ ¢/lb.	= \$ _____

Estimated cost first 4 months \$ \_\_\_\_\_

**Four months to nine months**

750 lbs. growing ration	@ _____ ¢/lb.	= \$ _____
1,200 lbs. alfalfa hay	@ _____ ¢/lb.	= \$ _____
5 months on pasture	@ \$ _____/month	= \$ _____

Estimated cost next 5 months \$ \_\_\_\_\_

**Nine months to calving (24 to 28 months)**

_____ months on pasture	@ \$ _____/month	= \$ _____
300 lbs. of grain mixture	@ _____ ¢/lb.	= \$ _____
4,000 lbs. alfalfa hay	@ _____ ¢/lb.	= \$ _____
6 blocks salt	@ _____ ¢/blk.	= \$ _____
_____ lbs. silage	@ _____ ¢/lb.	= \$ _____

(Use silage if pasture is poor quality during any part of the period or to substitute for up to half the hay.)

Estimated cost 9 months to calving \$ \_\_\_\_\_

Total estimated cost \$ \_\_\_\_\_

## REFERENCES

### Printed Material

1. *Maximum Credit Charges Allowed in California*, Leaflet 2843. Order from county 4-H office.
2. *Use Credit Wisely*, Leaflet 2844. Order from county 4-H office.
3. *Shop for Your Loan*, Leaflet 2846. Order from county 4-H office.

4. *Before You Sign a Contract*, Leaflet 2836. Order from county 4-H office.
5. Livestock market reports.

### Other Helps

Resource people—representatives from lending agencies such as banks, and production credit associations, money management advisers.

# FACILITIES AND EQUIPMENT

Help each member decide how to provide the facilities and equipment suited to his project and resources. Good facilities and equipment help the individual do the job more efficiently, effectively, safely, and humanely. Facilities and equipment may be rented, borrowed, purchased, custom-made, or member-made. Before starting a dairy project, the member needs to have completed his or her plans and arrangements for: living space (dry lot and pasture); shelter or housing; feeding and watering; fitting and showing; and handling (see Management).

### Things Members Can Learn

- Feeding space and watering facilities needed by animals
- Storage space needed for feed and equipment
- Kinds of shelter and housing used in area
- Safety around animals and equipment

### Things Members Can Do

- Draw a plan of ground and building layout
- List equipment and facilities on hand and those needed
- Build or obtain items needed
- Maintain facilities and equipment

## KEY INFORMATION

**Living Space.** Cattle need space for “elbow room,” exercise, and safety for themselves and handlers. Provide 25 square feet or more

for a calf up to 3 months of age. Mature, lactating cows need a minimum of 125 square feet in free-stall housing to 500 square feet in open-corral housing. On irrigated pasture a heifer 1 to 2 years old needs about one-half acre.

**Shelter.** A shelter protects the animal from harsh elements, such as sun, rain, snow, wind, or extremes of heat and cold. A simple, well-ventilated, 8' x 8', three-sided lean-to is ample for one animal. Allow 7 feet of head room at the lowest point. The structure can be of metal, wood, or other materials.

**Water.** Cattle require water for digestion, keeping cool, and other body functions. Provide clean, cool, drinkable water at all times. Lactating cows need 3 to 5 gallons of water daily for each gallon of milk produced. A member can use an old bathtub, wash trays, 50-gallon drum (cut in half), commercial tanks or automatic waterers. Buckets should be used only at fairs.

**Feeding (concentrates).** Three feet of manger or trough space is needed per head for mature cattle. Animals under 10 months of age need 1 to 2 feet of manger space. The trough should be 6 to 8 inches deep and 15 to 18 inches wide, with the top edge about 20 inches above ground. For mature cows use manger 12 inches deep, 32 inches wide, and top edge 30 inches above ground. Use small pans or boxes only at fairs. Feed hay in bunker or manger. Self-feed minerals in a small box about 12" x 12" x 6", protected from rain.

**Fitting and Showing.** Provide a show box for equipment. For more information, see Fitting and Showing, unit 7.

**Handling.** Fences, pens, stocks, scales, loading chutes, head gates, squeeze chutes are all useful and sometimes essential.

**Other Equipment.** Such items as veterinary, dehorning, castration, hoof trimming, and other equipment may be needed. For details, see Management, unit 9.

**Special Note.** Consider problems of drainage, odors, flies, noise, and other environmental factors.

## REFERENCES

### Printed Material

1. *Dairy Design*, Leaflet 2325. Order from county 4-H office.
2. *Elevated Calf Pens*, Leaflet 2327. Order from county 4-H office.
3. *Individual Stall Housing for Dairy Cattle*, Leaflet 2330. Order from county 4-H office.

### Other Helps

Lumber yards, libraries, breed associations, farm supply stores, farm catalogs, and dairy farms.

# FEEDING

A 4-H member may have an outstanding dairy project with excellent facilities, but may not succeed because he or she has a poor knowledge of what makes a balanced ration. Before getting an animal, the member needs to learn to identify various kinds of feeds and know their importance in the ration. The member can either mix home-grown grains in a balanced ration or buy a complete dairy mix. In either case, the member must know the total cost of feed. As a leader, you need to help members understand that the lowest priced feed doesn't always make the best ration.

### Things Members Can Learn

- Anatomy of the digestive tract
- Feeds and feeding terms
- How to identify common feeds
- What feeding equipment is needed
- How to start an animal on feed
- Daily feed requirements
- Hand and self-feeding methods
- Feeding precautions
- Most economical ways to obtain a ration
- Pounds of feed needed to produce 1 pound of gain
- About feed additives
- Nutritional deficiency symptoms
- How to figure number of days an animal will be on feed
- How to keep feed records

### Things Members Can Do

- Build or buy feeding equipment
- Purchase feed
- Feed an animal on a regular schedule
- Keep feed and water troughs clean
- Keep cost, gain, and other feeding records
- Visit a feed mill and feedlot
- Give a demonstration on feeds or feeding
- Help a younger member with feeds and feeding

### Feeding Equipment

For information about troughs, watering, storage, and other equipment, refer to Facilities and Equipment.

### Feed Items

**Ration**—the amount of feed an animal eats in a 24-hour period.

**Balanced ration**—a ration that has the right amounts of protein, energy, minerals, vitamins, and water.

**Roughage**—feed that is low in digestibility and high in fiber content. (Examples: hay and pasture.)

**Concentrate**—feed that is high in digestibility and low in fiber content. (Examples: barley, oats, and other grains.)

**Carbohydrates**—those nutrients in a feed that provide energy.

**Fiber**—that part of a feed that is hard to digest. (Examples: straw and plant stems.)

**Minerals**—substances that build bones and promote good health. (Examples: calcium, sodium, phosphorus.)

**Proteins**—nitrogen containing compounds composed of combinations of amino acids. They are used for building and repair of body tissues (muscle) and for regulation of metabolic functions (enzymes, hormones).

**TDN**—total digestible nutrients or that part of a feed that is digestible (energy).

**Vitamins**—food nutrients that animals require in small amounts for many metabolic functions.

### Feeding Tips

Don't change feeds suddenly. Feed at the same times every day. Feed only what the animal will eat without waste. Make sure that clean, fresh water is always available. Always have feed equipment and shade available. Provide sufficient trough space. Keep troughs clean.

## KEY INFORMATION

### Feeds to Know

Identify and know the uses of corn, barley, oats, milo, wheat (whole, ground and rolled), beet pulp, bran, cottonseed meal, soybean meal, bone meal, iodized salt, alfalfa hay, other hays, pasture, and the difference between good and poor quality hay.

### Feeding Rules of Thumb

- Birth to 7 months—Colostrum first 3 days, then whole milk or milk replacer at the rate of about 10 percent of body weight for the first 6 to 8 weeks. A 16 percent crude protein calf starter grain mix should be available free-choice up to 6 pounds per day, and free-choice alfalfa hay.

- 7 to 12 months—free-choice high quality alfalfa hay or clover pasture, and 2 to 6 pounds of high-energy concentrate with about 16 percent crude protein.
- 12 months to calving—free-choice alfalfa hay or good clover pasture. Feed up to 10 pounds concentrate during the last two weeks before calving. Silage can be fed to replace part of the hay to heifers over 12 months of age. If pasture or hay is poor quality, a few pounds of concentrate should be fed past 12 months of age in order to maintain normal growth rate.
- Cattle normally eat from 2 to 3 pounds of feed for each 100 pounds of live weight.

### Minerals and Vitamins

Alfalfa hay and clover pasture are rich in all minerals except phosphorus. Most grains, by-product feeds, and protein supplements are good sources of phosphorus. Alfalfa hay is a good source of vitamins A and D. Most commercial concentrate mixes will have added minerals and vitamins. Provide salt and minerals free-choice.

### Water

Water is necessary for digestion, cooling, and other body functions. Provide clean, cold, palatable water at *all* times. A yearling needs 10 to 15 gallons per day. Lactating cows need 4 to 5 gallons of water daily for each gallon of milk produced.

### Hay

Hay can be baled, cubed, or pelleted for non-lactating animals. Do not feed pelleted alfalfa hay to lactating cows because pellets reduce butterfat content.

### Feed Weights (pounds per level quart)

Barley, 1.1 pounds; whole oats, 1.0 pound; ground corn, 1.5 pounds; cottonseed meal, 1.5 pounds; wheat bran, 0.5 pound; and 3-wire alfalfa bale, 125 pounds.



## SAMPLE RATIONS FOR LACTATING COWS

Sample roughage rations	lb./day/cow				
Alfalfa hay (17% crude protein)	30	15	10	15	5
Corn silage (30% DM)	0	45	60	0	75
Oat silage (25% DM)	0	0	0	55	0
Recommended concentrate mix	(10 to 20 lbs./cow depending on milk production)				
TDN (%)	75	75	75	75	75
Crude protein (%)	12	15	18	13	21
Calcium (%)	0	0.1	0.5	0.1	0.8
Phosphorus (%)	0.7	0.7	0.7	0.7	0.8

### Digestive Problems

**Bloat**—too much gas forms during digestion. Change to nonfibrous feeds such as oat hay.

**Scours**—diarrhea that may be caused by irregular feeding, dirty feed troughs, pails, or water, and by certain germs.

**Impaction**—impaction of digestive tract is usually caused by poorly balanced rations.

**Hardware**—indicates that the animal has swallowed wire or some other metal.

### REFERENCES

#### Slides and Filmstrips

1. *California Livestock Forages* (slide set with cassette). Order from county 4-H office.
2. *Animal Nutrition* (slide set with cassette). Order from county 4-H office.

### Teaching Aids

1. Advanced 4-H project record sheets with feed records.
2. Feed companies have suggested feeding procedures.
3. *Feeding Calves*, Leaflet 2328. Order from county 4-H office.
4. *Minerals in Common Feeds and Allowances for Lactating Cows*, Leaflet 2332. Order from county 4-H office.
5. *Nutrient Requirement Tables for Dairy Cattle*, Leaflet 2333. Order from county 4-H office.

### Other Helps

Resource people, such as local feed dealers and dairymen.

## HEALTH

In this unit, members will: observe a normal dairy animal; apply preventive measures to maintain animal health; determine the signs of a sick animal; and gain knowledge of correct treatment methods.

### Things Members Can Learn

- Normal animal body temperature; respiration rate; characteristics of nasal, eye, and oral discharges, of stool and urination, of healthy skin and hair coat; normal movement and appetite
- Signs of abnormal animal activity and effects on growth, milk production and ability to show
- Preventive medicine, including sanitation (water, feed area, and manure disposal); correct, balanced feeding; vaccination and parasite control; good, well-maintained housing; safe handling and shipping techniques
- Treatment methods, including oral, injection, and topical
- Correct drug choices and reasons for selection

## RECOMMENDED HEALTH AND VACCINATION SCHEDULE FOR DAIRY

WHAT	WHEN	COMMENTS
Blackleg Malignant edema	Vaccinate at 4 to 6 months of age	If done earlier than 3 months of age, repeat vaccination at 6 months of age.
Brucellosis	Vaccinate at 2 to 6 months of age	Heifers only. State provides vaccine, but it must be administered by a veterinarian. This is the only vaccination that requires the services of a veterinarian.
Infectious Bovine Rhinotracheitis (IBR) (Rednose)	Vaccinate at 4 to 6 months of age	Recommended for calves to be shown and on dairies that have had this virus disease. Don't administer at the same time as Brucellosis vaccination. Nasal and intramuscular vaccines are available.
Bovine Virus Diarrhea (BVD)	Vaccinate at 6 to 8 months of age	Recommended for calves to be shown and on dairies that have had this virus disease. Don't administer at same time as Brucellosis vaccination.
Parainfluenza (PI <sub>3</sub> )	Vaccinate when needed	Recommended only if respiratory problems occur. Nasal and intramuscular vaccines are available. Usually done with IBR vaccination.
Leptospirosis	Vaccinate at 4 to 6 months of age	Can be done at same time as Blackleg or IBR. May need to use multivalent vaccine (grippotyphosa, hardjo, pomona, etc.).
Intestinal worms	Drench at weaning or any time animal appears parasitized	Use anthelmintics in amount recommended on container label; read label for withdrawal and indications.
Bacterial infections	Medicate when required	Consult veterinarian for usage of sulfas or antibiotics.
Pinkeye	Medicate when required	Use subconjunctival injection of antibiotics if necessary. Place animal in shade and out of dust. Fly control is best available prevention. Glue-on eye patch can help.
Lice	Fall and early winter as needed	Use spray or powder. Follow directions on container label. Several effective insecticides available. Dustbags/backrubbers for lice and fly control.
Cattle grubs (heel flies, warbles)	Treat at end of heel fly season, usually September	Use systemic grubicide. Follow label directions exactly. Be sure to follow instructions concerning time of year to treat.
Footrot	Medicate as required	May need antibiotics for treatment. Prevent by reducing exposure of feet to moisture and abrasions.

Additional vaccinations may be necessary, depending on local conditions; consult your local veterinarian for specific advice on vaccination schedules and treatment of sick animals.

## Things Members Can Do

- Use normal animal to take rectal temperature each day for a week (morning, noon, and afternoon); observe respiration, stool, skin, and hair coat
- Use preventive measures: provide good housing; feed balanced ration on regular schedule; maintain clean, fresh water and feed; provide clean bedding; and dispose of manure
- Vaccinate an animal or have veterinarian demonstrate
- Spray or dust an animal for fly control
- Treat an animal for grubs
- Train and groom the animal
- Visit a dairy and discuss health of animals, including signs of illness and possible treatments, with manager
- Keep chart on any illnesses of animal, on treatments given, and daily or weekly observations
- Visit slaughterhouse to observe carcass and gross anatomy; study reasons for condemnation of organs

## KEY INFORMATION

The normal temperature of a dairy animal is 101.5° F. and is measured rectally. Respiration rate is 15 to 30 breaths per minute; stand back from animal and count the in-and-out movements of ribs. Check stool for: solid or liquid content, color, undigested material, blood, mucus content.

Treatment methods include oral, injected and topical applications. Injections may be intramuscular, subcutaneous, intradermal, subconjunctival, intravenous, and intraperitoneal. Topical applications include systemic (pour-on grubicide), surface (dust, as for flies), or local (ringworm, eye, cuts). To select the correct drug, consider effectiveness, dosage, treatment intervals, precautions and adverse reactions, residues, and price. See the "Recommended Health and Vaccination Schedule for Dairy".

## REFERENCES

### Slides and Filmstrips

1. *Examination and Observation of a Normal Animal*, No. 75/159 (slide set with cassette). Order from county 4-H office.
2. *Detecting Illness and Determining Its Cause*, No. 76/110 (slide set with cassette). Order from county 4-H office.
3. *Prevention and Treatment of Disease*, No. 75/146 (slide set with cassette). Order from county 4-H office.

### Films

*The Rumen Story*. Order from county 4-H office.

### Teaching Aids

Collection of bottle labels and insert literature of various drugs, vials, etc. A good responsibility for a junior leader.

### Printed Material

1. *Lice on Livestock and Horses*, Leaflet 2298. Order from county 4-H office.
2. *Cattle Grubs*, Leaflet 2293. Order from county 4-H office.
3. 4-H Veterinary Science Project manuals for members and leaders: Unit 1, Normal Animal; Unit 2, Animal Disease; Unit 3, Immunology, Zoonoses, and Public Health. Order from county 4-H office.
4. *Fly Control in the Dairy*, Leaflet 2329. Order from county 4-H office.

### Other Helps

Resource people, such as local veterinarians and experienced dairymen and herdsmen.

# FITTING AND SHOWING

This unit on dairy fitting and showing includes information on feeding, leading, brushing, washing, and clipping. Correct knowledge of these points will help the member prepare an animal for fairs and expositions. Discuss fitting and showing topics in project meetings or on home visits. Encourage junior leaders to help members learn correct techniques.

Don't groom a member's animal for a show. Your role is that of a teacher, not a hired hand or herdsman.

## Things Members Can Learn

- How to correctly feed an animal
- How to overcome feeding problems
- Basic equipment and how to use it
- How to wash and groom animals
- Base dates used in showing grade and purebred animals
- How to read pedigrees
- How to enter an animal in a fair
- How to correctly feed and prepare an animal for showing at the fair
- How to correctly show an animal

## Things Members Can Do

- Make a rope halter
- Wash and groom an animal
- If needed, clip animal for show
- Visit purebred cattle ranch where animals are being prepared for show
- Correctly train and polish hoofs and horns on horned animal
- Have a practice fitting and showing contest
- Read premium book to find out: date entries are due; arrival time; show schedule; required health and registration papers; entry fees; awards and activities related to showing
- Study professional photographs

## KEY INFORMATION

### Feeding

(See Feeding, unit 5, for more complete details). Problems encountered in dairy projects can be traced to: 1) feeding poor-quality or moldy hay, 2) feed intake reduced by a dirty, muddy feed box, 3) dirty water or watering facility not kept filled, and 4) feed that is stale or musty.

### Leading

Gentle the animal by placing a rope halter on it. Tie the halter lead about 18" above ground level with a slip knot. Tie to the manger a few days at first, starting at least 6 weeks before fair time. Let the animal get thirsty, then lead to water. Have a friend follow and urge animal while you pull on the halter. Lead the animal with a show halter and practice showing twice daily for 6 weeks before the fair. Walk backward on the left side of calf, holding the folded lead strap in left hand. Keep the animal's head up so its topline will be level during walking. The animal should be taught to stand in place at least 10 minutes at a time. In posing, the front feet should be squarely under the animal and even. When showing a cow, the hind foot on the judge's side is usually kept a half-step forward. Stand a heifer or bull so that the hind leg on the judge's side is slightly to the rear. While standing at the head, learn to move the front and hind feet with your left hand holding the halter and your right hand on the animal's left shoulder. In the show ring lead in a clockwise direction. The exhibitor should leave about 3 feet of space between animals.

### Grooming

Grooming begins after halter breaking. Thoroughly wash animal at least once before clipping. Use any gentle soap that makes a lot

of suds. Wet animal then put soapy water all over with a brush and scrub out dirt. Rinse soap completely out of the hair. Brush dry and place blanket on animal. Many herdsmen wash animals the day they arrive at the fair and again the day before show day. Wash any dirty spots daily, especially on the legs, flanks, knees and hocks. The longer manure soaks into the hair the more permanently it will stain. Wash switch thoroughly, scrub out waxy secretions in the tip, rinse, and fluff hair by combing upwards a few strands of hair at a time. If your animal has a white switch you can use one teaspoonful of bluing bleach in a bucket of water to help reduce discoloration. Frequent washings with soap are preferred.

Frequent brushing and washing are necessary for a clean, attractive hair coat. Brushing twice daily for at least 10 minutes each time will clean and condition the hair. Brush out dirt with downward strokes using rice-root brush and a rubber brush to get rid of dead hairs. Keep the calf in a cool, shady place. At least 6 weeks before fair time tie animal in well-bedded stall. Clean twice daily. Keep blanket on animal. Clipping improves appearance of the animal. Clip clean and close over every part of the head, face, ears, and neck back to the shoulders, except the eyelashes. Sometimes hair is left in "U" of neck to blend profile of neck more evenly into withers. Clip clean and close around brisket, back of rear udder, and where legs blend into rear udder of lactating cow. Clip down the legs from hock to hoof. Cows are usually clean-clipped under the body to outer underline and the entire udder. Heifers and bulls are not clipped under

the belly. Ayrshires should have an inch or more of "bangs" over base of horn. On Brown Swiss shorten hair inside ear instead of clipping close. On Milking Shorthorns clip ears and tail but not the rest of the body. Clip the tail from above the switch to the tail head blending into rump and back.

## REFERENCES

### Slides and Filmstrips

1. *Fitting Dairy Cattle*, No. 75/189 (slide set with cassette). Order from county 4-H office.
2. *Handling and Showing Dairy Cattle*, No. 75/196 (slide set with cassette). Order from county 4-H office.
3. *Grooming and Showing Dairy Cattle*, No. 514. Order from county 4-H office.

### Printed Material

1. Commercial grain and feed companies have several promotional and educational brochures about feeding and fitting.
2. Dairy Breed Associations have material available.
3. *Dairy Cattle Showmanship*. C. W. (Jack) Robinson, Tambark Publications, P.O. Box 200, Clements CA 95227.

### Other Helps

Herdsmen who exhibit dairy cattle at shows.

# MARKETING

In this unit members explore the importance of the milk marketing system. It will emphasize the need for decision making, and explain how milk is marketed. Production and marketing are the most important functions of a business. A 4-H dairy project is a business enterprise. Profit is the motive for going into

business. Financial profit (money) keeps economic wheels in motion; social and human values (honesty, integrity, respect, and cooperation) keep society in motion. This project provides opportunity to share in both returns.

### Things Members Can Learn

- How milk is marketed
- General aspects of the California Milk Pooling Law
- Sanitation requirements related to the marketing of milk
- Milk classification
- How cull cows are marketed
- Standards for Grade A and Grade B milk

### Things Members Can Do

- Study general outline of California Milk Pooling Law
- Learn what products are made from the 4 classes of milk
- Have milk inspector discuss dairy sanitation and differences between a Grade A or Grade B dairy
- Study producer milk statement to see how milk payment works
- Visit dairy lab at a creamery to see how milk is tested for quality
- Attend dairy cattle auction
- Attend purebred dairy cattle sale

## KEY INFORMATION

### Marketing

Most of the milk in California is sold under provisions as outlined in the California Department of Food and Agriculture pooling plans for fluid milk. All milk in California is regulated for quality. Only Grade A milk falls under the pooling law.

### Prices

The price of milk is governed by the milk pooling regulations and the Bureau of Milk Stabilization. Prices for the producers are set after public hearings are held where testimony is given as to the actual cost of production.

The lowest price paid to the dairyman for any milk is based on the federal support price program.

### Milk Grades

Milk is produced in either a Grade A or Grade B dairy. To obtain a Grade A permit, the dairy facilities must meet certain sanitation and construction requirements. The cows must also meet certain health requirements. Grade A dairies must meet standards that are higher than those set for the Grade B dairies.

### Animal Health

Keeping animals healthy is important to the marketing of milk. Strict regulations exist on the use of antibiotics on lactating dairy cows. Milk and milk products are checked for traces of antibiotics to make sure they do not get into the public food supply. The federal Food and Drug Administration approves the use of materials for treating dairy cattle but it is up to the dairymen to follow the directions on the label.

### Milk Quality

To be sold, milk must meet specific quality standards. These are set by law and regulated by milk inspectors. Failure to meet the standards for the grade of milk you are producing will cause the milk to be "degraded" until the standards are again reached.

### Milk Classes

There are four classes of milk depending on the products made. They are Class I, Class II, Class III, and Class IV. Fluid milk and cream which is in the bottle or carton comes from Class I only. Class IV is primarily for making butter and powdered milk. The milk law sets the products which are made from the other classes.

## REFERENCES

### Slides and Filmstrips

*Shopping with Martin for the Milk Group*, No. 604. Order from county 4-H office.

### Printed Material

1. *Dairy Information Bulletin*. California Livestock and Crop Reporting Service, Box 1258, Sacramento, CA 95806.
2. *California Milk Stabilization Laws* (leaflet). Bureau of Milk Stabilization, California Department of Food and Agri-

culture, 1220 N Street, Sacramento, CA 95814.

### Other Helps

Resource people such as dairymen, creamery managers, dairy auctions managers, etc.

## MANAGEMENT

Dairy management spans most of the subject matter in the dairy science projects: planning, selection, facilities and equipment, breeding, feeding, health, marketing, and recordkeeping.

### Things Members Can Learn

- The methods of dairy cattle identification
- Value of production testing
- How to restrain animals safely and securely
- Safety around animals and equipment
- Breeding procedures
- Value of keeping and using records
- Value of evaluating animals for type

### Things Members Can Do

- Develop a calendar of operations and activities
- Keep and use records
- Identify animals by branding, tattooing, marking
- Castrate bull calves for market use
- Dehorn
- Trim feet
- Learn to clip udders
- Study and see how production data is used for management purposes

### KEY INFORMATION

The following calendar plan is a general guide for dairy projects. Members and leaders should adjust dates and operations in keeping with their climate, area, type of industry, farms, and resources available.

### October–November

Secure needed financing  
Provide needed facilities and equipment  
If purchasing calves, buy those born in January, February, July or August  
Breed heifers to calve in July or August  
Break calves to lead  
Start calves on growing ration gradually  
Treatment for lice and grubs, if needed  
Depending on age, dehorn and identify

### December–January

Vaccinate for brucellosis at 3 to 6 months  
Watch for respiratory problems  
Provide a ration for maintenance and growth for heifers  
Pregnancy check any animals bred in October and November  
Treatment for lice, if needed

### February–March–April–May

Breed heifers to calve in January and February  
Break calves to lead or continue training  
Brush calves frequently  
Plan and present a demonstration  
Check and repair show equipment  
Vaccinate any new calves

### June–July–August–September

Control flies, dust and odors  
Watch for pinkeye and treat accordingly  
Learn fitting and showing techniques  
Provide summer shelter  
Pregnancy check animals bred in April and May  
Trim feet as needed

Prepare animals for calving  
Wash and clip animals for show  
Clip hair  
Show animals at local and state shows  
Vaccinate and identify any new calves  
Complete records and record books  
Plan project for next year

## REFERENCES

### Slides and Filmstrips

*Mastitis—Prevention and Control*, No. 222 (cassette with script). Order from county 4-H office.

### Printed Material

1. *Fly Control on the Dairy*, Leaflet 2329. Order from county 4-H office.
2. *Individual Stall Housing for Dairy Cattle*, Leaflet 2330. Order from county 4-H office.
3. *Make Dairy Production Records Work For You*, Leaflet 2331. Order from county 4-H office.
4. Morrison's *Feed and Feeding*.
5. Feed company handbooks on feeding.

### Other Helps

Resource people such as dairymen, veterinarians, etc.

# EXTRA ACTIVITIES

Extra activities provide the member with project enrichment. These areas might well be termed "extra curricular". They may be on an individual basis (example: individual judging); or involve only two or three members (a demonstration); or in some cases a group activity (a group demonstration, judging team, or community service).

### Things Members Can Learn

- Different breeds of dairy animals
- How to select dairy animals based on type
- How a milking system works
- Nomenclature of the animal
- To make decisions by judging animal classes—giving reasons and presenting demonstrations
- To be a more effective speaker by giving oral reasons and public presentations
- To promote livestock conservation such as animal health, loading and hauling safety, and proper facilities including pens, housing, etc.

### Things Members Can Do

- Observe type demonstrations of dairy animals
- Participate in judging events to improve type concept
- Observe other members giving 4-H demonstrations on dairy cattle

- Show how type may affect production
- Participate in demonstrations or judging contests to improve proficiency in speaking
- Plan and conduct dairy animal selection schools and demonstration events
- Demonstrate how a milking system works

## KEY INFORMATION

### Demonstrations

Planned presentations by one or more club members, teach by illustration or example specific information related to a project or activity. A beginning 4-H'er needs careful guidance, direction and encouragement. The member's first demonstration should be simple and something he or she has learned well in the project. Help the member make a simple step-by-step outline. Make practicing fun. Leader praise of the member is invaluable and is a key to building member self-confidence for future demonstrations. A simple outline would be:

Introduction—why the topic was chosen and why it is important

Body—how the job is done

Summary—what was accomplished; what this meant to the 4-H member, and what it could mean to the audience.



Assist members with originality in the title, introduction, body, and summary of the demonstration. Help them find the newest references for preparing demonstrations. Encourage appropriate attire. Encourage junior leaders to promote demonstrations in project groups. Counsel members on steps in developing demonstrations, such as visualizing the audience, choosing a subject, deciding on a goal, gathering information, working on a plan, choosing equipment and visuals, practicing, and delivery. Review demonstration judging sheet with the members.

### Livestock Conservation

This should be the concern of every dairy leader and member. Individual and organized group efforts can provide the member with much knowledge on this often abused subject. Encourage members to participate in the livestock conservation program; undertake a "Let's Solve a Problem" research paper relating to livestock conservation; give a livestock conservation demonstration; conduct a safety check on a rancher's equipment, pens, gates, etc.; or conduct a safety check on loading and hauling animals. These areas may lead to self-determined projects for older members.

### Judging

This is the process of analyzing animals and measuring them against a standard commonly accepted as the "ideal" type. Today, in dairy circles we hear much about the modern dairy cow. Would you know one if you saw it? To recognize the "modern type" animal, leaders and members must: have a mental image of the ideal type; know animal nomenclature; develop keen powers of observation; make logical analyses; develop independence of thought and abilities to give effective reasons; and practice judging.

The "true type" dairy cow is a strong cow showing a feminine head, long clean neck blending smoothly into the shoulders. She exhibits dairy character in that she is free of excess fat. She has a deep barrel and a long body. She stands on strong, sound feet and legs. The mammary system is well developed

with strong udder attachment, both fore and rear. The teats are squarely placed and of proper length.

### Entering Judging Contests

In local sessions a member should learn how to: 1) enter; 2) properly mark his placing on judging score card; 3) observe a class and animals within class (that is, as member looks at animals from the rear when the class is lined up, the number one animal is on the left and the number four animal is on right); 4) observe the animals from distance of 10 to 20 feet; 5) develop a system for observing and comparing, with side, rear, front, top, and walking views; 6) study the entire class, make comparisons with the ideal as well as compare one animal with another (the time element usually is 10 to 12 minutes for judging a class); 7) take notes on class, study these in preparation for giving oral reasons; and 8) follow instructions as to where and when to give reasons and deliver without notes.

Developing and presenting dairy judging reasons gives the member opportunity to justify his evaluations. When giving reasons, member should: keep presentation short (about two minutes); stand 6 to 8 feet from judge (stand erect, feet apart, hands behind back); look judge straight in the eye; be definite; speak slowly and clearly in conversational tone; have smooth delivery and use correct grammar; stress animal's strong points; bring out major differences using comparative terms and deliver concise, final statement and end reasons strongly.

### REFERENCES

#### Slides and Filmstrips

*Variations in a Demonstration Theme*, No. 75/190 (slide set with cassette). Order from county 4-H office.

#### Printed Material

1. *A Leader's Guide to 4-H Club Demonstrations*. 4-H 8013.
2. *Livestock Judging and Evaluation*. Dr. Roger E. Hunsley, Audio-Visual Pro-

duction Department, Memorial Center, Purdue University, Lafayette, Indiana 47907 (\$1.50 plus postage).

3. Hoards Dairyman Judging Kits.

4. Miscellaneous animal selection material available from dairy cattle breed associations.

## GROUP ACTIVITIES

Working together to "Make the Best Better" describes this unit. Some of the group activities may have several members working together for a common goal (example: providing an animal "petting zoo" for urban youth). Other activities may have only one or two members working together (example: two members owning the same animal and learning nutrition, health, etc.; or two or more members involved in a non-ownership project by managing a few head of heifers for a rancher). Group activities are applicable to rural, non-farm, suburban, and urban members. In a total animal science program group activities have no boundaries (example: those enrolled in foods and nutrition, wood-working, electricity, entomology, or other projects could easily participate in group activities related to dairy).

### Things Members Can Learn

- Group dynamics (both the individual's and the group's role)
- Problem solving (example: during an outbreak of a disease, take steps to solve the problem, by conducting a survey, finding possible solutions, executing a plan, and evaluating it)
- Selection, management, and feeding of the animal
- Zoning regulations in a county as they relate to animal life
- Management, including genetics, selection, and production records

### Things Members Can Do

- Participate in group tours of dairies, livestock auctions, veterinary clinics, technical schools (such as artificial insemination workshops), dairy symposiums or clinics, and college or university animal science departments and farms

- Cooperate with local governments, civic groups, etc., in providing livestock "petting zoo" for urban children
- Plan, design, construct, and maintain a local 4-H farm where suburban and urban 4-H members may keep animals
- Two or more members may purchase, feed, manage, and sell an animal
- Plan, conduct and evaluate group activities such as judging schools and "show and tell" events related to animals, livestock conservation, demonstrations
- Relate group activities to Public Relations.

### KEY INFORMATION

Group activities and public relations are similar. However, not all group activities are for public relation purposes, and vice versa. If you as a leader are responsible for setting up a 4-H farm, animal petting zoo, etc., *do not neglect to:* 1) check with the local leader first; 2) visit with the County 4-H Youth Advisor about the feasibility of the project, insurance coverage, etc.; 3) contact individuals owning the property, note feasibility, payment and insurance; 4) consult with the county planning commission on zoning regulations; 5) develop a tentative plan and discuss with members involved and their parents; 6) work out equitable plan of duties (construction, general maintenance, clean up).

On group tours you will want to work with members or individuals planning the tour, and review with them why it is being conducted. Remind all members about good conduct while on the tour, and make plans for evaluation and wrap-up, including a "thank you" to the host.

Other youth groups in the community may be interested in some of your ideas and ventures. Members should be encouraged to cooperate and work toward responsible goals.

## REFERENCES

### Slides and Filmstrips

*Planning Your Exhibit*, No. 354 (slide set

with script). Order from county 4-H office.

### Other Helps

1. Dairy groups in the local area.
2. Local civic and government groups.
3. Toastmasters Club.

# PUBLIC RELATIONS

There are many opportunities to work, learn, and serve in this public relations unit. Three basic needs are to: 1) foster good relations with dairymen, dairy industries, and organizations; 2) improve public knowledge and appreciation of the animal sciences; and 3) help other people understand the need for raising animals for food, fiber, and recreation—balanced with concern for the environment.

### Things Members Can Learn

- About dairy breed associations (local, county, state) and their purpose
- About junior memberships in breed associations, including fees, activities, benefits, etc.
- About industry improvement, issues, prices, and weather as it affects markets, pollution, and manure disposal
- About experts in your area who are willing to give talks or demonstrations on specific animal science subjects
- Which individuals or organizations in your area are concerned with promoting good public relations for the dairy industry.
- Find out what kinds of help these individuals or organizations need
- The different steps or processes involved in preparing milk products from time of marketing until sold for home use

### Things Members Can Do

- Join and become active in junior group of breed association and inform other 4-H members about how to become junior members of breed associations

- Assist organizations in prompting public relations or giving programs at fairs, public events, shopping centers
- Participate in breed association events, field tours, and other activities
- Work on junior fair boards and sales committees, and find sponsors for events
- Use models and other teaching aids to give demonstrations on ways of using milk products at fairs, schools, and shopping centers
- Solicit industry support (money, meat, printed materials) for other 4-H members to use or to give out in visits or demonstrations
- Arrange dairy field days or tours for members
- Arrange animal fairs at schools
- Arrange for school or other youth group to tour a dairy farm or milk processing plant or explain the operation
- Host a non-4-H member on a visit to a fair or farm to promote better understanding of the dairy industry

## KEY INFORMATION

Public relations is an everyday job. Each activity can contribute to a personal store of information for use in conversation, formal talks, or demonstrations. Help the 4-H member always be alert to how he or she can help improve the public image or internal relations of the animal science industries. Learn to find and ask for assistance, whether time or other resources. People like to respond—as individuals or as organizations.

Remember that an essential part of good public relations is acknowledging any type of assistance or participation. This can be done by letter, phone calls, or recognition at meetings or through press releases.

## REFERENCES

### Slides and Filmstrips

1. *Public Relations—Animal Science*, No. 75/161 (slide set with cassette). Order from county 4-H office.
2. *Man-Animal Relationships in California*, No. 75/191 (slide set with cassette). Order from county 4-H office.

### Printed Material

1. *The 4-H Reporter*, 4-H 8012. Order from county 4-H office.

2. *Shopping for Milk and Dairy Products*, Leaflet 2409. Order from county 4-H office.
3. *How To Make An American Type Cheese*, Leaflet 2414. Order from county 4-H office.
4. *Making Cottage Cheese at Home*, Leaflet 2416. Order from county 4-H office.

### Other Helps

1. Chamber of Commerce, Farm Bureau, Grange organization.
2. Leading farmers.
3. Bankers.
4. County Cooperative Extension Advisors.
5. Vocational agriculture teachers and departments.

# SCIENCE

Working with dairy cattle is really studying applied biology. Nutrition relates to feeding; genetics and reproduction to breeding; health to disease prevention. This unit provides a deeper look into how an animal grows, produces food, and reproduces.

### Things Members Can Learn

- How feeding, breeding and management of dairy cattle relate to the basic sciences of nutrition, genetics, physiology, and animal medicine
- The nutrient requirements of dairy cattle
- How to meet the requirements with available feed (range, pasture, hay) and necessary supplements
- The basics of a good breeding program
- About production record systems
- How dairy cattle perform (daily production, annual production, feed efficiency, etc.) and improvement through type
- How to increase the breeding efficiency through breeding practices

- The importance of heat detection

### Things Members Can Do

- Study milk secretion
- Study nutrition and feeding requirements of dairy cattle
- Conduct feeding trials under direction of local dairy farm advisor
- Explore use of supplemental minerals and vitamins when deficient under local field conditions
- Study the genetics of dairy cattle
- Contact breed associations and California Dairy Herd Improvement Association for record information
- Study the reproductive functions of dairy cattle
- Visit a college or university dairy science department
- Study and select bulls based on the USDA sire summaries
- Study and analyze the electronic data processing (EDP) production records for individual cow evaluation

## KEY INFORMATION

**Genetics.** This is the science of how characteristics are passed from parents to offspring.

**Genes and Chromosomes.** Complex chemical compounds that are the carriers of inheritance and exist in pairs in the animal. Each parent contributes one-half of the offspring's chromosome and genetic makeup. Most animal characteristics are determined by several sets of genes, a few by a single gene.

**Inheritance of Sex.** This is governed by chromosomes from the male. One-half the sperm cells contain x-chromosomes; one-half contain y-chromosomes. The eggs from the female contain only x-chromosomes. There is a 50-50 chance for an xy-chromosome matching in the offspring which produces a male, and a 50-50 chance for a female, xx-chromosome.

**Heritability.** Variation in animals is caused by inheritance from parents and is a measure of resemblance between parents and offspring. Animal variation can also be influenced by environment—different feed, climate, etc.

**Measuring Heritability.** The range of heritability is from 100 percent (exactly like parent) to 0 (unlike parent).

**Traits.** Animal characteristics usually are grouped into classes: low (below 20 percent); medium (20–40 percent); and high (above 40 percent). Some important heritability estimates are:

Mature equivalent milk	32 percent
Mature equivalent fat	26 percent
Fat percent	39 percent
Mastitis	8 percent
Body weight	40 percent
Dairy character	20 percent
Milking speed	23 percent

**Nutrition.** This is the study of the process of feeding and use of feed by an animal.

**Digestion.** The process by which an animal makes food absorbable by dissolving it and breaking it down into simpler chemical compounds.

**Digestive Tract.** The route the feed follows as it is broken down: mouth and teeth, stomach, small intestine, large intestine, anus.

**Ruminant.** Animals such as cattle, sheep, goats and deer, which have a complex stomach divided into four parts (rumen, reticulum, omasum, abomasum). Allows for digestion of high-fiber diets.

**Nutrients.** Types of chemicals in feed required by animals: water, proteins, vitamins, minerals and energy.

**Nutrient Requirement.** The amounts of nutrients needed for growth, fattening, reproduction, and lactation. Varies with sex of animal, species, and environmental influences.

### Feed Definitions

**Crude protein** comprises all the nitrogen-containing compounds in a feed.

**Digestible protein** is the amount of usable protein in a feed. Approximately 60 percent of the crude protein for roughages, 75 percent for high concentrate feeds.

**Ether extract** is a measurement of fat in a feed; fat has 2.25 times the energy value of carbohydrates and protein.

**Fiber** is hard-to-digest carbohydrates made up of cellulose.

**Nitrogen-free extract** is an indicator of the more easily digested carbohydrates; mostly starches and sugars; but also contains part of the indigestible lignin.

## REFERENCES

### Slides and Filmstrips

1. *Animal Nutrition* (colored slide set with script). Order from county 4-H office.
2. *A Lesson in Genetics*, No. 76/112 (colored slide set with cassette). Order from county 4 H office.

## Films

1. *The Rumen Story* (colored, 16 mm.). Order from county 4-H office.
2. Contact feed dealers, breed associations, and others for available films.

## Printed Material

1. *Introduction to Livestock Production*. H. H. Cole, Editor, Freeman & Company, San Francisco; purchase at local bookstore.
2. *Dairy Cattle: Principles, Practices, Problems, Profits*. Foley, Bath, Dichinson, and Tucker.

# CALIFORNIA DAIRY INDUSTRY

The dairy industry is a major part of California's total agricultural economy. Dairy products rank first in the total value of the state's agricultural production. California consumers who are now approximately one-tenth of the total U.S. population consume a tremendous amount of dairy products. This unit looks at the scope of the dairy industry, its relation to the environment, and the changes in the industry as it attempts to supply the increasing demand for its products.

## Things Members Can Learn

- The contribution of dairy products to your county's total agricultural income
- People and businesses involved in producing dairy products for home use
- The numbers and kinds of dairy organizations; their purposes and activities
- Different types of dairies and dairy operations
- The location of the dairy industry in the state
- The changes in the dairy industry in recent years

## Things Members Can Do

- Contact organized state groups that represent the dairy industry
- Talk to officers of county dairy breed organizations
- Talk to officers of the county dairy herd improvement association
- Visit dairy farms
- Visit milk processing plants and retail stores

- Study and learn the significance of dairy commodity figures distributed by the California Crop and Livestock Reporting Service
- Prepare and present demonstrations showing the importance of the dairy industry

## KEY INFORMATION

Dairy products rank first in value among all agricultural commodities produced in California. There were approximately 800,000 dairy cattle on farms in California in 1975. This number has remained constant for the last thirty-five years. However, the number of dairy farms has decreased drastically during that time, about 50 percent fewer just in the last ten years. This has resulted in more cows per dairy farm.

At the same time production per cow has increased as dairymen attempt to supply the demand for dairy products to the more than twenty million consumers in the state. The California Crop and Livestock Reporting Service reports that milk production increased from 10,820 pounds of milk per cow in 1965 to 13,301 pounds in 1974, and butterfat production increased from 395 pounds per cow to 479 pounds per cow during that same period.

However, the California Dairy Herd Improvement Association, which has over half of the state's milk cows in a regular testing program, reports average production of 15,292 pounds

of milk and 583 pounds of butterfat per cow in 1975 in those herds. Three-fourths of the cows on test are in the San Joaquin Valley.

#### REFERENCES

##### Slides and Filmstrips

*California Livestock Industry*, No. 681 (140 slides and cassette). Order from county 4-H office.

##### Printed Material

1. *Facts about California Agriculture*, Leaflet 2290. Order from county 4-H office.
2. *California Livestock Statistics, Annual Report*. Order from California Crop and Livestock Reporting Service, P.O. Box 1258, Sacramento, CA 95806.
3. *Projections of California Agriculture to 1980-2000*, Bulletin 1847. Order from county 4-H office.

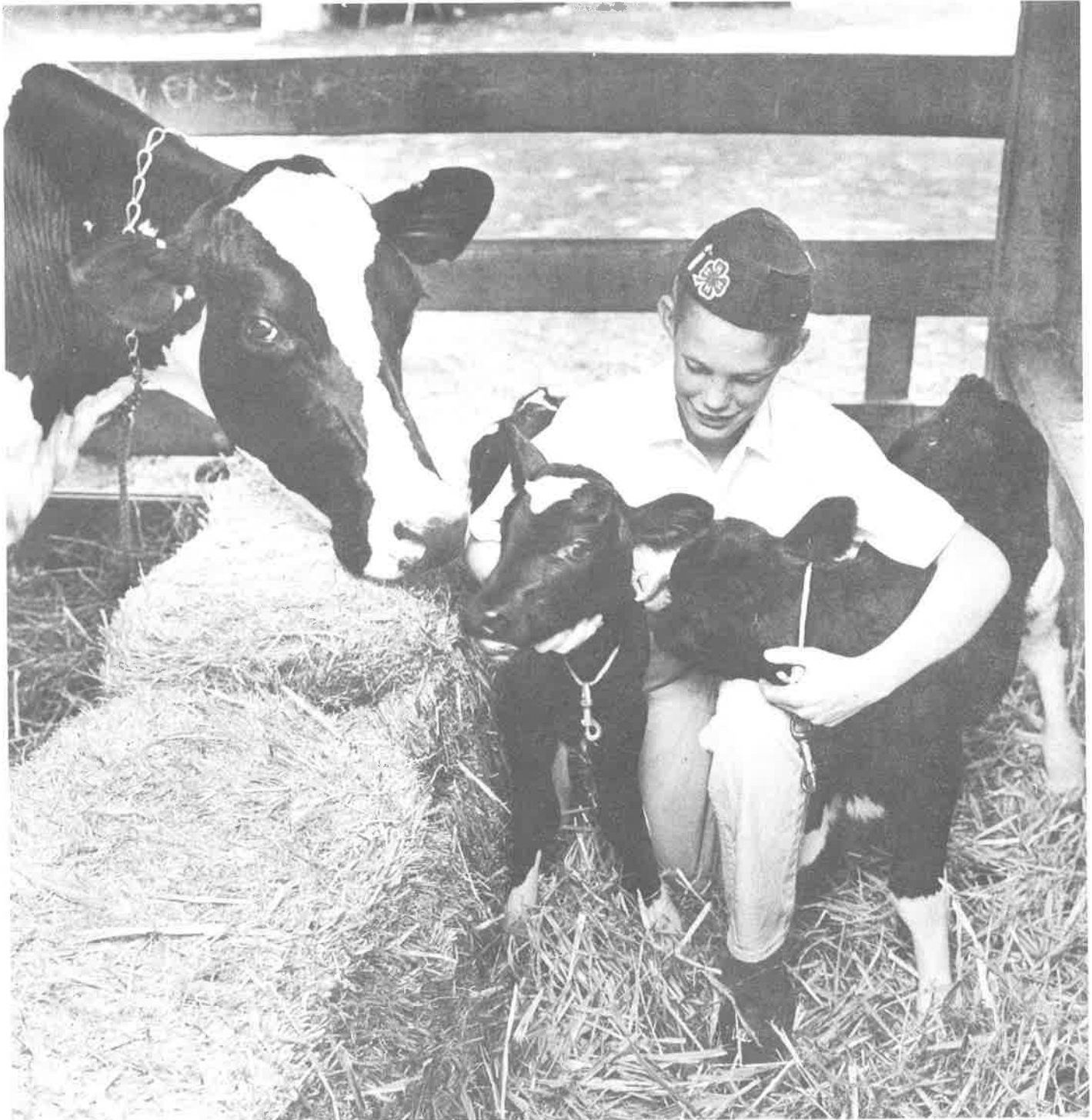






# 4-H

## DAIRY PROJECT



Division of Agricultural Sciences  
UNIVERSITY OF CALIFORNIA

REVISED, JULY 1978

4-H-2009

As you begin your 4-H dairy project, you should know that it will mean lots of work. The fun of going to the fair, being with other dairy project members, and taking part in many activities is only a small part of the dairy project. There will be real problems to solve: selecting a good calf, feeding according to the best methods, controlling disease, and planning for the future so that someday you will have a herd you can be proud to own.

Many of the most successful dairy farmers in our country today were 4-H members in their youth. Not only did they learn the most scientific methods of managing dairy cattle, they also discovered how to become good citizens through 4-H activities and the help of their leaders.

“To Make The Best Better,” the 4-H motto, includes improvement of farm and community as well as your dairy project. With good sportsmanship and cooperation, you, as a 4-H member, are bringing forth a new chapter in the history of American agriculture.

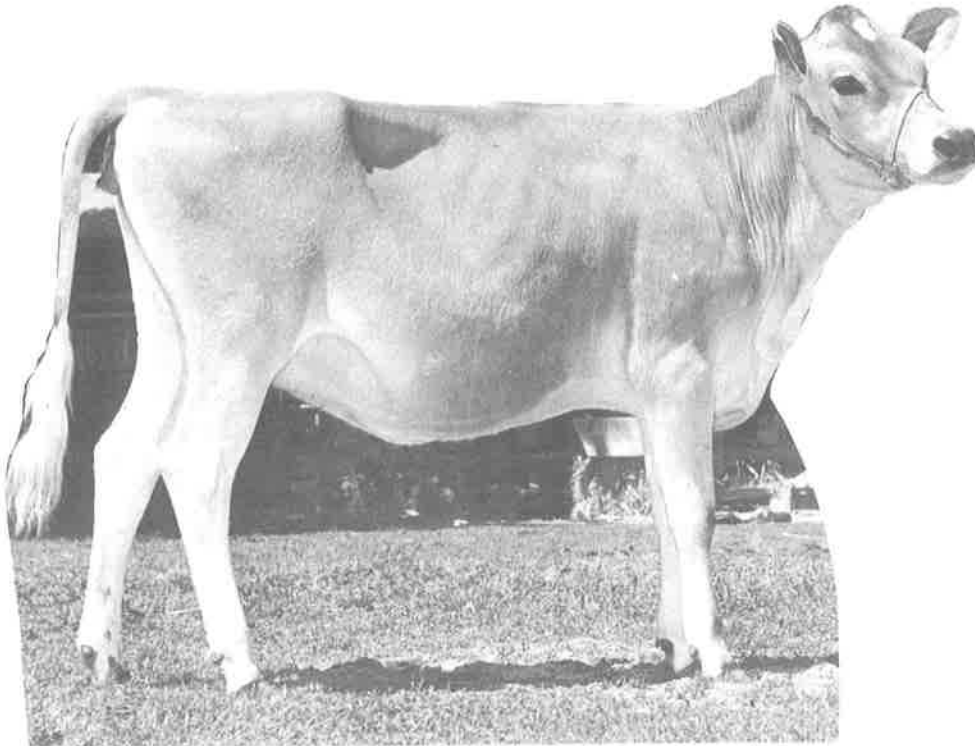
Good luck with your dairy project! May your experiences make you a better citizen as well as a better dairyman.

*Prepared by 4-H Youth Advisor Alex Gibson, Stanislaus County, and Farm Advisor Glenn Voskuil, Merced County.*

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### SELECTING YOUR CALF

You may need help in selecting your calf. People you can ask to help are your father, your project leader, a member of a breed association, or the farm advisor. Regardless of where you get your calf (from the home herd or from a neighbor) or who furnishes the money (your parents or the local bank), it should be strictly a business deal, to be repaid in full with interest.

#### Which Breed?

The choice of a breed is very important. But, remember, there are good animals in all breeds! There are many advantages in having

the same breed as your neighbors and other project members, especially the benefits received from cooperation with others in advertising, breeding, and selling. Here are some ideas that may aid you in your selection of breed:

- Choose a breed that gives you good selection.
- Choose a breed that is popular in your area.
- Select a breed you think you will like.

Never pick a breed because you think there will not be much competition at fairs and field days. Look forward to competition! Competition is fun, educational, and can develop good sportsmanship.

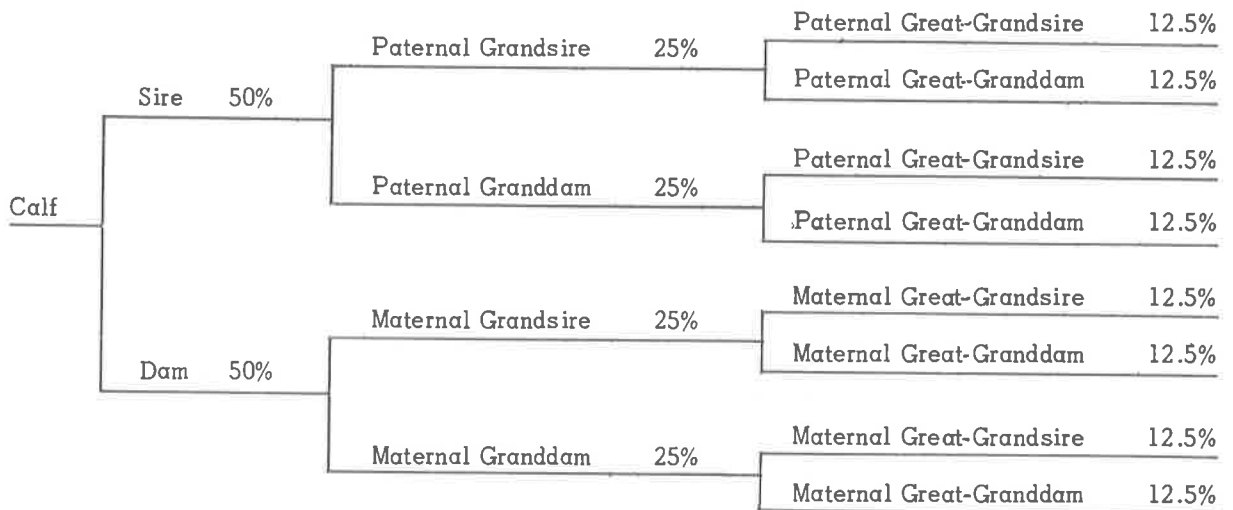
## Registered or Grade?

A registered dairy animal is a purebred with registration papers filed with the purebred dairy cattle association; the animal's sire and dam are of the same breed and its ancestry may be traced back to its origin. All other animals are grades or crossbreds. Many successful 4-H projects have started with a grade calf. However, if at all possible, it is better to start with a registered calf. The difference in the initial cost is not great, and the value of your animals increases as your herd develops. However, don't select a calf just because it is registered. Papers will not assure you that your calf will mature into a cow you want to milk, or whose daughters you would pick for your herd. Get some help to study the calf's family from these papers (see pedigree). Remember, it would be better to have a good grade calf than a poor registered calf.

Select the best calf available with the thought that this could be the foundation for the herd that someday may be earning your living. Keep the following things in mind once you have decided on the breed:

**Pedigree** is a record of the animal's ancestors. Registered animals have complete records and their ancestors can be traced to the original animal imported into the United States. A pedigree will tell us about type and production of the calf's close ancestors. When studying a pedigree, give equal importance to each ancestor in the same generation, and greatest attention to the close ancestors. The pedigree will show that the dam (the female parent) contributes 50 percent of the type and production to the calf, and the sire (the male parent) contributes the other half. Each of the four grandparents contributes 25 percent, and each great-grandparent contributes 12.5 percent.

### CALF GENERATIONS



## COMMON DAIRY CATTLE DISORDERS— THEIR CAUSES AND PREVENTION

So that you are aware of some of the common dairy cattle disorders which may occur in your heifer, the causes, symptoms and prevention of the common ones are listed below. If your heifer shows signs of any, contact your veterinarian for diagnosis and prescribed medication.

**Infections Scours** — diarrhea, dehydration, unthriftiness.

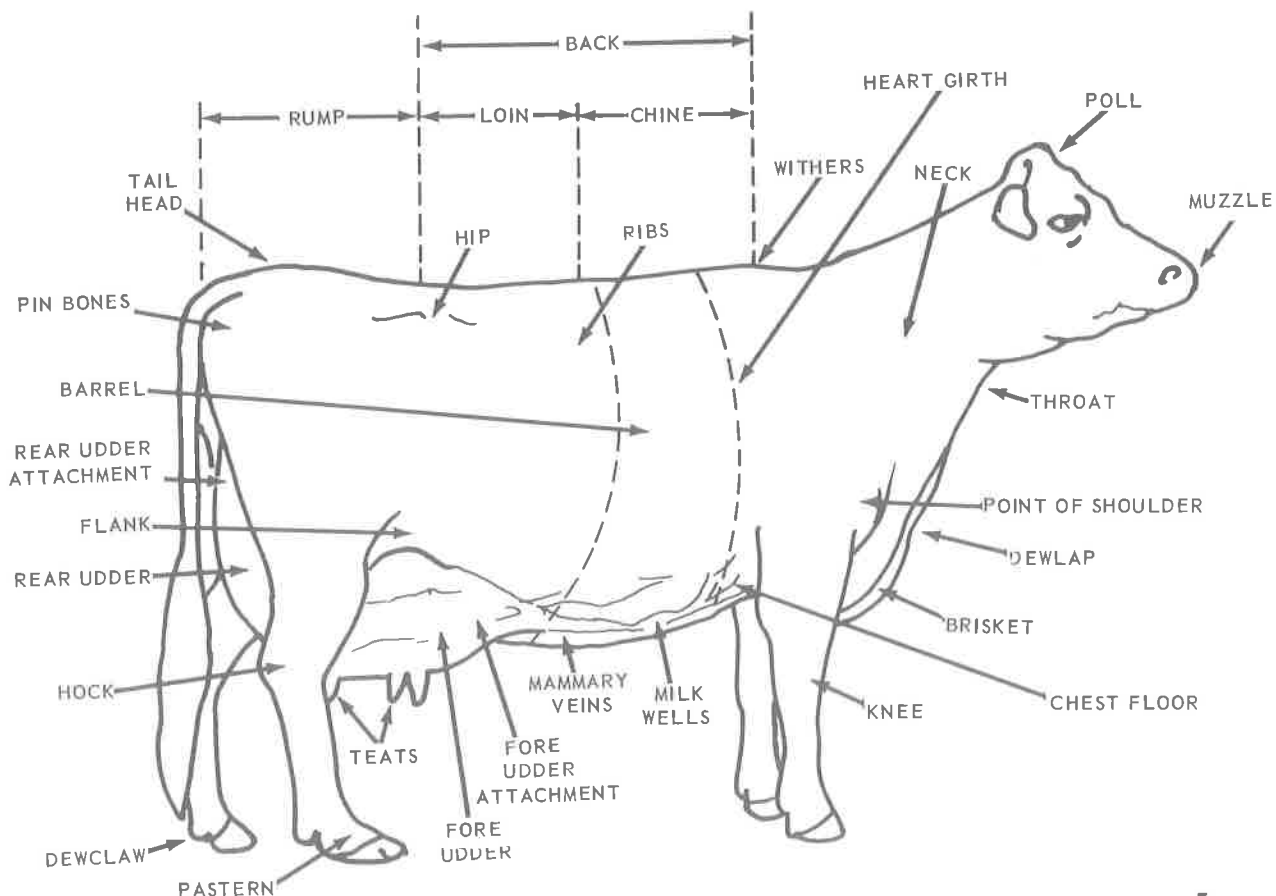
Scours are easily transferred from one animal to another through manure of an infected animal, so maternity stalls and calf pens should be thoroughly cleaned and disinfected between each calving. To prevent, feed calves colostrum immediately after birth; keep them in clean housing; antibiotics may be necessary. Repeated problems mean you need professional help.

**Ringworm** — small to large scaly hairless gray areas especially on an animal's face around the eyes.

Ringworm is easily spread by contact with other animals. Infected animals should be kept separate from healthy ones and the ringworm treated. Will also occur in dark, poorly ventilated stables. Treatment may consist of tincture of iodine applied with vigor with an old toothbrush (don't get it in the eyes).

**Bloat** — the production of gas in the rumen of an animal producing a stable foam which interferes with belching and causes gas to accumulate. This can cause death.

Bloat can occur in animals on pasture, among animals fed green chopped forage, among animals fed dry feed and/or silage, and in young animals of nursing age. To prevent, use a mixture of grasses and



legumes in pastures, keep animals from the pasture during the early lush growth stage of plants, and provide dry feed in addition to pasture. To cure, remove animal from pasture or away from feed it has been eating. Position it with front feet higher than rear feet and place a "bit" in its mouth. If bloat is in advanced stage, a stomach tube may be necessary to relieve gas. If you are not well experienced, seek veterinary help.

**Shipping Fever** — high fever, pneumonia, depression, loss of appetite caused by stress during transport.

To prevent, avoid placing animal under stress during shipment, whether it be by truck, boat or plane. Early treatment with the correct antibiotic is important. This disease can kill or stunt your animal. Calves with the above history and a rectal temperature of 104° F or higher are highly suspect and need your attention.

**Foot Rot** — invasion by organisms of the skin and bottom tissues of an animal's foot causing progressive swelling and lameness.

To prevent, eliminate wet places where sharp stones may injure an animal's feet. Where large numbers of animals are affected, foot baths in walkways may be useful (seek professional help on what to use).

**IBR—Red Nose** — a virus which invades the nasal cavity, sinuses and windpipe. Serious cases develop pneumonia.

There is no treatment against the virus, but antibiotics may be used to control secondary bacterial invaders. Infected animals should be treated and quarantined. Several

vaccines are available. Some can not be used on pregnant cows so read the directions carefully.

**Good breeding** cannot be determined by simple observation of the animal. Inspecting family production records and asking questions about the calf's dam and sire will give you information about the performance of the calf's family. The family should be noted for high production records. The dam, granddams, and great-granddams, should have records based on twice-a-day milking. The records should show a production of 450 pounds or more of butterfat for heifers and 600 pounds or more for mature cows.

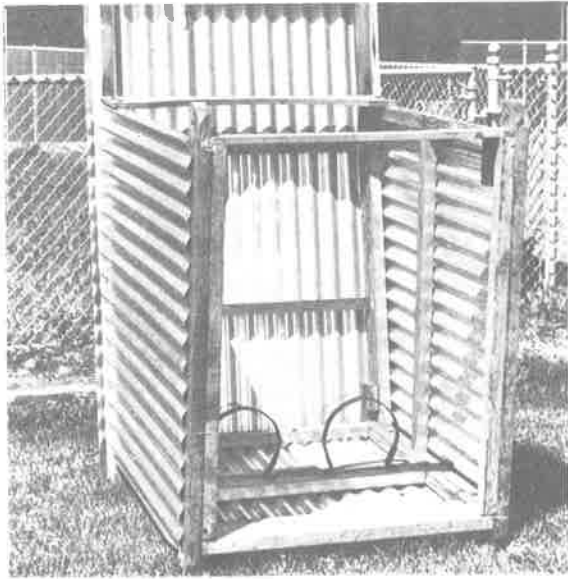
Your calf should be the daughter of a good proven bull, and her dam should have been sired by such a bull.

**Good type** cows are usually the best. In most cases a dam and sire of good type will produce a calf that will be of good type. By "good type" we mean a calf with the following characteristics:

- a. Feminine appearance
- b. Size—large
- c. Hide—loose and of medium thickness
- d. Back—strong and straight; rump—level and broad
- e. Barrel and chest—deep with large capacity and good length
- f. Withers, shoulders, hips, and pinbones—prominent
- g. Teats—fair size, well apart, squarely placed on udder
- h. Legs—well placed, fine boned, and straight
- i. Neck—long, straight and refined
- j. Mouth—wide; nostrils—large

## A HOME FOR YOUR CALF

Now that you have selected your calf, what kind of housing must you provide for your animal? Almost any type of building will make a suitable home for your calf. Cold weather will not harm it, but damp bedding or drafts are likely to cause trouble.



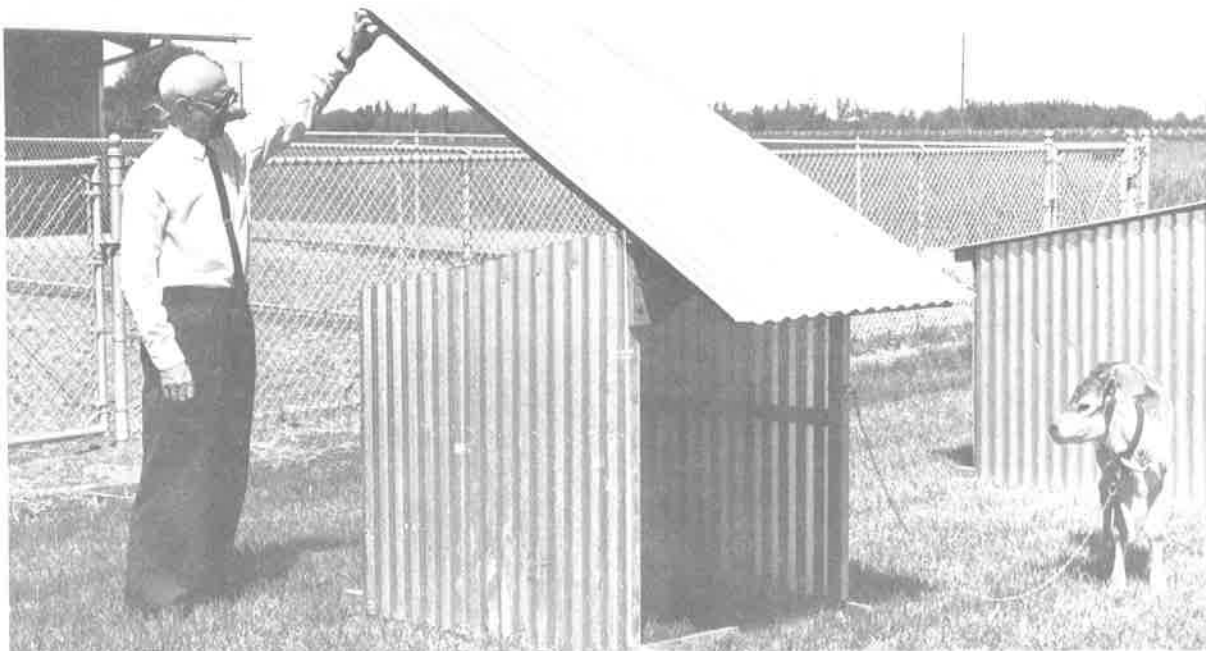
**INDIVIDUAL CALF PEN** —above view: pen on its back.  
Note hoops for buckets.

It is not necessary to invest in an elaborate barn for a calf under 2 months of age. An individual pen of the type shown here is excellent for raising your calf. Be careful of dogs when using these open pens.

Individual pens placed so that calves will not come in contact with one another, help to prevent the spread of diseases and will reduce calf losses. Move the pen to another spot after the calf outgrows it and before you put another calf in it. By moving the pens, you will reduce the hazard of infection from a previous calf. This type of structure will house your calf until it is 8 to 12 weeks of age.

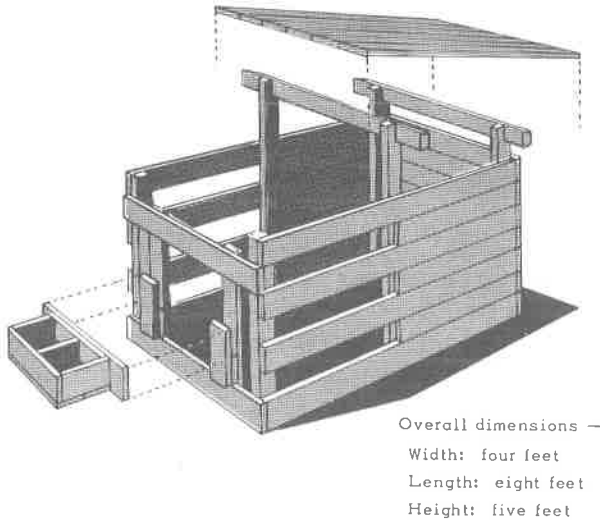
Roving dogs can create an annoying and costly problem to calf raisers. If this threat exists, the structure illustrated on the next page provides a distinct advantage because the attached pen provides some protection. Dogs are less likely to invade the enclosed area.

A shed, with community pens for grouping calves according to age, is more suitable for calves over 1 month old. Provide a stanchion in the community pen for calves that are still receiving milk.





#### ANOTHER TYPE OF CALF PEN.



Overall dimensions —  
Width: four feet  
Length: eight feet  
Height: five feet

Keep your calf pen and feeding utensils clean at all times. Thoroughly clean at frequent intervals the walls, partitions, stanchions, floors, and mangers, then sanitize them with a strong disinfectant to prevent diseases from infecting your calf.

#### CALF HEALTH POINTERS

Keep your calf healthy! Prevent sickness. It is better to prevent calf diseases than to cure them. A calf cured of pneumonia or scours usually will be stunted, weak, and unthrifty.

A calf that is properly fed and receiving vitamins, minerals, and other nutrients will resist disease more easily. Colostrum and whole milk are very important for the young calf. Green leafy hay is especially important for calves from the very beginning.

Keep your calf pen clean and dry to help to get rid of bothersome flies. Flies carry disease. Your leader, father, farm advisor, or veterinarian can give you information on the newest chemicals used for killing flies.

Don't stop here, consult your veterinarian for a complete program of disease prevention.

#### Scours

Common calf scours, an abnormal looseness of the bowels, usually is caused by over-feeding, using dirty feed pails, feeding sour milk, or feeding milk too rich in butterfat. If your calf shows signs of scouring, reduce its feed. Scrub and sterilize the feed pails daily. Keep your calf dry, out of drafts, and separated from other sick calves. If calf continues to scour, call your veterinarian.

#### Calf Pneumonia

Calf pneumonia, an infection of the lungs, usually follows some other disease. It also may result from chilling in cold, damp, drafty quarters. When an animal has pneumonia, it loses its appetite, has high fever, its muzzle is dry, and the skin is rough.

If your calf has pneumonia, place it in clean, dry quarters, give it plenty of fresh water, and call your veterinarian.

#### Lice

Lice are very discomforting and can prevent growth. They are usually a winter problem. Symptoms include loss of hair and a scurfy type of skin caused by rubbing. Various commercial sprays are available for treating lice. Printed instructions for use of the material should be strictly followed. Good management is recommended.

#### Ringworm

Ringworm is caused by a vegetable parasite (fungus) which gets in the pores of the skin and causes irritation. The calf's neck, head, and shoulders will show circular patches covered with crust and scabs. There is considerable itching. A calf with ringworm should be isolated. Use a stiff brush with soap and water to remove the scabs. Then apply tincture of iodine to the infected areas.

## Brucellosis – Vaccination

The state law requires that all calves be vaccinated for brucellosis between 4 and 6 months of age. This disease causes mature cows to freshen too soon and have a stillborn calf. After losing her calf, the cow will produce less milk and may become sterile.

## Warbles

Warbles, or grubs, appear as bumps on the animal's back. The adult warble, known as the "heel fly," lays its eggs around the feet of the animal in spring and early summer. The larvae hatch out in 4 to 6 days, penetrate the skin, and work their way to the neck and back region. The hatched grubs then leave through the hide. Warbles can cause loss of milk production. The only control is to remove the grubs by hand, or to apply the insecticide rotenone. Carefully follow directions for the insecticide application.

## Tuberculosis

This is a disease of man and animals. Tuberculin tests will show if an animal is infected. These tests are scheduled every 2 years on all California dairy herds. In some areas, tests are scheduled annually. If you buy an animal that has not been tested recently, have the calf tested before you put it with other animals.

## FEEDING YOUR CALF

Feed your calf properly. A good healthy calf should grow fast but not get fat. Calves need the right kinds and the right amounts of feed to grow fast and keep healthy.

It's more fun to raise a calf from the time she is born. You can watch her grow and teach her new things. If this is your first calf project, you are going to learn as your calf learns and grows.

Your purpose in raising a calf is to make her grow into a cow which will produce milk.

Good cows make money for their owner, so help your calf become a large healthy cow.

Small calves need high quality grains that contain plenty of protein and carbohydrates. Their stomachs are small and cannot use much forage, such as hay. As the calf grows, she will eat more alfalfa hay. Then she can grow well with less grain.

## Feeding Calves the First 3 Months

If the calf is born on your place, refer to section on Your Dairy Cow. It tells how to care for the calf during the first 3 days of her life. The first milk from the mother, called colostrum, is very important to the new calf.

## Colostrum

The single most important thing for the survival of the baby calf is a generous feeding of colostrum soon after birth. Colostrum is the first milk from the cow and is produced for about 3 days after calving. It contains much higher levels of energy, protein, vitamins, and disease-resisting antibodies, particularly gamma globulin, than is contained in regular milk.

The calf should be fed colostrum within the first hour after birth and should continue to be fed colostrum for 2 or 3 days. Calves are born with practically no antibodies to ward off disease-causing organisms. It is very important that they receive colostrum as soon as possible after birth because it supplies the needed antibodies until they are able to produce their own. The timing is critical also because the ability of the calf to absorb colostrum antibodies across its intestinal wall decreases rapidly after birth, and is practically nil after 24 hours. If calves do not receive colostrum soon after birth, mortality rates can be high. It is difficult to be certain that this early care has been given to calves of unknown origin purchased at public sales.

### Whole Milk Method

Whole milk, when properly supplemented with concentrates and forages, is the best food for producing fast growth and healthy calves.

Sometimes whole milk is not available or is too expensive to use. Some good substitute methods of feeding calves are explained later.

**Do not overfeed.** The small stomach of a young calf cannot handle large amounts of food. Overfeeding may cause indigestion and scouring which will keep the calf from growing properly. Sudden changes in the amount or kind of milk or grain that is fed a calf may cause indigestion. Make changes slowly—a little each day until the change is completed. If a calf scours, cut the milk in half for one feeding. Then slowly increase the amount of each feeding until she is back to the normal amount.

**Amounts of feed daily** vary with the size of the calf. The first 3 days she should have all the colostrum she wants. A general rule for the first week is to feed 1 pound of milk for every 16 pounds of body weight of the calf. Increase slowly to 1 pound of milk to every 10 pounds of body weight. Do not feed over 10 pounds a day for Holsteins, Brown Swiss, and Ayrshires; not over 7 pounds for Guernsey and Jersey calves. Feed milk until the calf is 8 weeks old. If you feed milk for an additional 4 weeks, you will have a stronger calf. For young calves, milk should be lukewarm. As the calf gets older, the temperature of the milk is less important. As you reduce the milk you must supply water.

**Calf starter** should be available to calves when they are about 1 week old. She will eat just a little because her stomach is small. Give her all she will eat up to 4 pounds a day. It is costly and difficult to mix small quantities of calf starter. Feed dealers have it already mixed for you.

Alfalfa hay should be fed when she is 1 week old. Even though she eats a small amount, it is important that she get started at this time. Select alfalfa that is fine stemmed, leafy, and green in color. Keep plenty of fresh hay available at all times. Change it once a day.

**Sanitation of milk pails or bottles** is very important. Milk may be fed from a pail, a pail with a nipple, or a bottle with a nipple. Wash the milk container after each feeding. Any milk left in the container is a good place for disease-causing germs to live. Dirty containers may cause your calf to get sick.

### Milk Replacer Method

A number of commercial milk replacers on the market contain varying amounts of dried skim milk plus some finely ground meals, such as fish meal, soybean flour, and blood meal. These formulas usually contain added vitamins, minerals, vegetable oil, and sometimes an antibiotic.



One way of getting your calf to drink out of a bucket.

The most successful formulas contain 60 to 80 percent nonfat milk solids (dried skim milk). Those that contain large amounts of meal and cereals are more difficult to keep in solution and more apt to plug up the nipple on the pail. Vegetable oil is added to replace the butterfat removed from the milk before it was dried. Fat is a good source of energy for animals. The formula should contain no more than 20 percent vegetable oil. Young calves are unable to use larger amounts of fat efficiently.

Warm water should be used in mixing the formula. The temperature should be about 100° F when the young calf drinks it.

Follow directions on the tag of the feed bag. It will tell you how much formula to mix in a quart or gallon of warm water. It also will recommend how many pounds or quarts to feed calves of various ages. Be sure it is properly mixed so each calf gets her share of the formula that does not go into solution.

Calf starter must be of good quality when fed with a milk replacer. Use a top quality commercial mixture and start feeding when calf is 1 week old. Keep increasing the amount until she eats 4 pounds a day. Continue feeding calf starter until the calf is at least 4 months old.

Alfalfa hay of top quality must be available at all times.

### Feeding Your Growing Calf

If you want your calf to grow fast and keep healthy and strong, give her plenty of good quality feed without being wasteful.

Continue the calf starter to about 16 weeks of age. At 12 weeks, start mixing in a little of the growing ration. Increase the growing ration and decrease the calf starter a little each day. After 2 weeks the calf should be eating all growing ration. By this time she should be eating 5 pounds a day. Continue

this feeding until 8 or 9 months old, then reduce the grain to 3 pounds a day. Feed this amount until she is at least 1 year old.

Alfalfa hay should be fed free-choice. Good quality hay is an important source of protein. Growing calves will eat about 2 pounds of hay for each 100 pounds of liveweight. For example, we expect a 400-pound calf to eat 8 pounds of good alfalfa hay in addition to her grain.

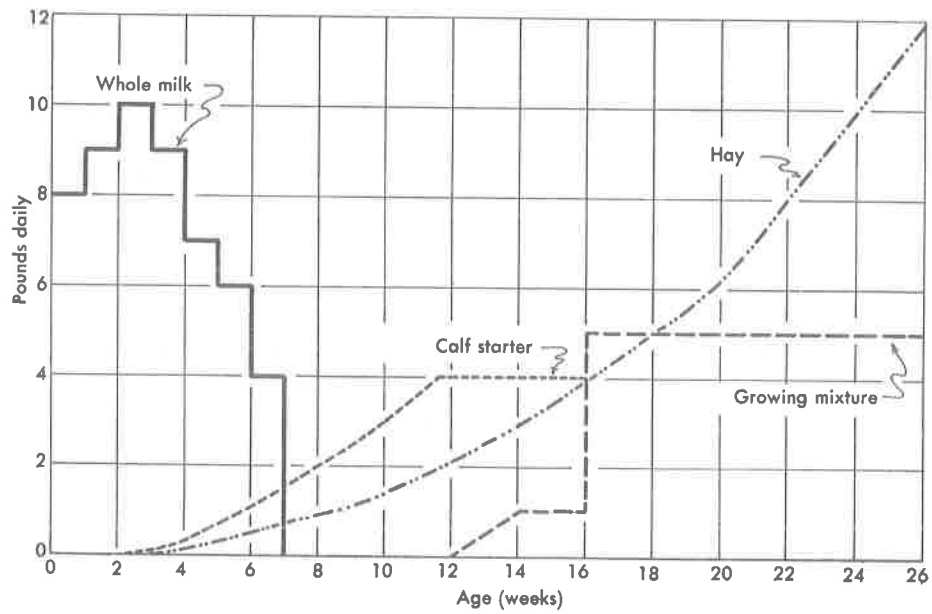
Corn silage is not recommended for calves under 6 months of age. A lot of silage at this early age tends to give the calf a potbelly. After 6 months, half the forage can be silage and the rest either good alfalfa hay, green chop, or pasture.

Pasture is good for calves when 3 months old. Put them in a small pasture near home so you can feed them their allotted grain and hay each day. The pasture is mainly a place to exercise for a calf this age. Do not expect her to eat only pasture until she is about a year old. She needs some hay and grain until she is 1 year old.

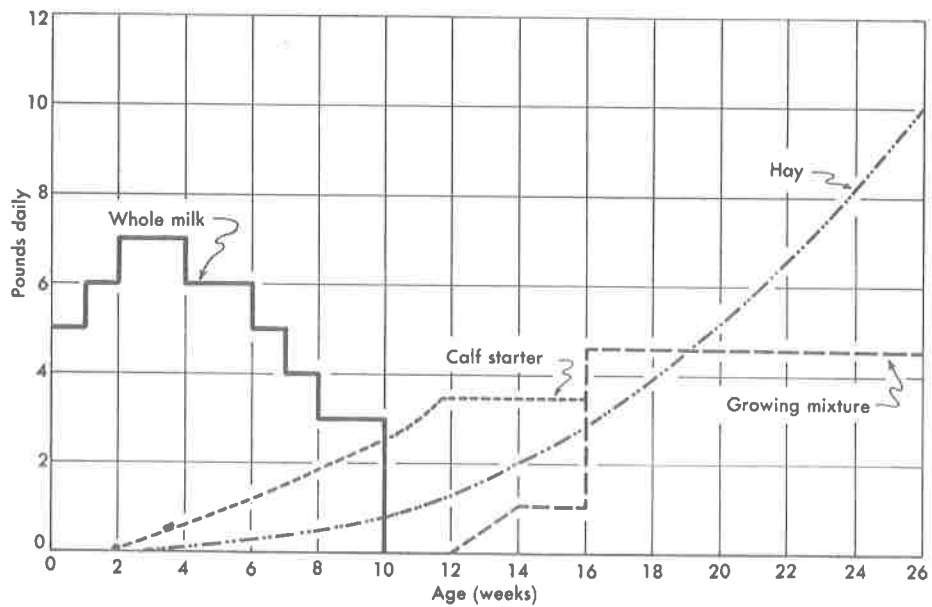


Start your calves on good hay at an early age.

# Feeding Schedules



Using dry calf-starter method for Holstein-Friesian, Brown Swiss, and Ayrshire calves.



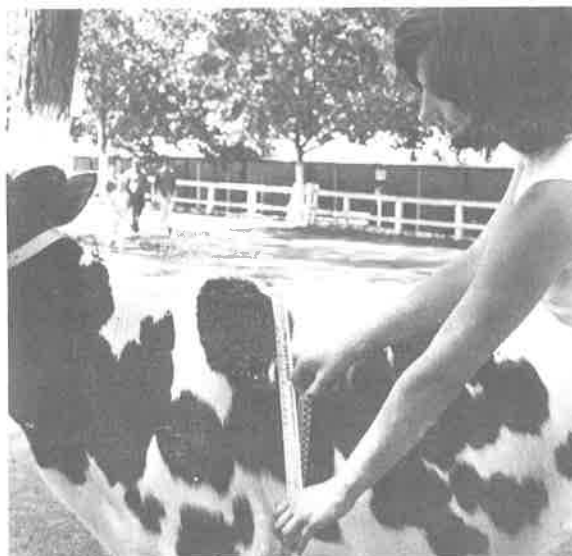
For Jersey and Guernsey Calves.

(Drawings from New York State College of Agriculture, Cornell University.)

Yearlings can grow well on top-quality forage. Hay, pasture, silage, and green chop are all good feeds. Use whichever is best for the season of the year. The secret to good growth is to give yearlings all they can eat of top quality forages. Grain is not necessary for good healthy yearlings.

Fresh water must be available at all times. Be sure it is clean so she will drink enough for her to grow fast and stay healthy.

The growth a calf makes is important. A 6-month-old calf should gain at least 1½ pounds a day. At 18 months of age, the Jersey will gain about 0.7 pound a day, and the other breeds about 1 pound a day.



Taping heart girth to determine weight.

**NORMAL BODY WEIGHT AND HEART GIRTH\*  
OF HEIFERS DURING THE GROWING PERIOD**

Age (in months)	Ayrshire		Guernsey		Holstein		Jersey	
	Weight (in pounds)	Girth (in inches)	Weight (in pounds)	Girth† (in inches)	Weight (in pounds)	Girth (in inches)	Weight (in pounds)	Girth (in inches)
Birth.....	72	29	65	28	90	31	53	27
1.....	89	31	77	30	112	34	67	30
2.....	119	34	102	34	148	37	90	33
3.....	158	38	133	36	193	40	121	35
4.....	198	41	173	39	243	43	158	38
5.....	245	43	216	41	297	46	199	41
6.....	293	45	260	43	355	49	243	44
7.....	344	48	305	46	410	51	286	46
8.....	389	50	350	48	462	53	324	48
9.....	433	51	389	50	509	55	360	50
10.....	469	53	427	51	552	56	393	52
11.....	502	54	459	53	593	58	420	53
12.....	538	56	490	54	632	59	450	54
13.....	577	57	524	55	671	60	479	55
14.....	611	58	556	57	705	61	507	56
15.....	638	59	584	58	746	63	530	58
16.....	669	60	605	59	782	64	558	59
17.....	697	61	634	59	809	64	580	60
18.....	725	61	663	61	845	65	601	60
19.....	758	61	686	61	878	66	622	61
20.....	793	63	712	63	912	67	642	62
21.....	818	63	737	63	952	68	665	63
22.....	844	65	763	64	986	69	684	64
23.....	871	65	788	64	1,024	70	708	65
24.....	902	66	818	66	1,069	71	733	65
27.....	909	68	876	67	1,151	74	816	67

\*Data from: Ragsdale, A. C. Growth standards for dairy cattle. Missouri Agr. Exp. Sta. Bul. 336:1-12. Reprinted 1942. (Heart girth measurements have been rounded off to the nearest inch.)

†Heart girth measurements for Guernseys have been adapted from Nebraska Agr. Exp. Sta. Res. Bul. 9):1-29. 1937.

## CARE AND MANAGEMENT OF YOUR GROWING CALF

### Registry Application

When the sire and dam are both registered, the offspring is eligible for registration. All breed associations have special forms to be used when making application for registration. These forms may be obtained from a breeder of registered cattle or by writing directly to the breed's national or state office.

Applications for registry should be sent to the breed office before the animal is 6 months old. After this age, the cost of registry may be increased. Be sure the application form is filled out completely and accurately. Follow all directions carefully.

**Junior membership** in the national breed association will permit registration at a reduced fee until the member is 21 years of age. Junior membership is open to a boy or girl who has at least one registered animal in his or her name. Application for junior membership should be made by the farm advisor or vocational agricultural instructor.

### BREED ASSOCIATIONS

Holstein-Friesian Association of America  
P.O. Box 808  
Brattleboro, Vermont 05301

American Jersey Cattle Club  
1521 East Broad Street  
Columbus 5, Ohio 43205

American Guernsey Cattle Club  
Peterborough, New Hampshire 03458

Ayrshire Breeders' Association  
Brandon, Vermont 05733

Brown Swiss Cattle Breeders' Association  
Beloit, Wisconsin 53511

### Housing and Corrals

When a calf is separated from its mother, place it in a pen by itself. Keeping a young calf separate and clean is an important step in keeping it healthy.

A pen in the barn with plenty of straw or shavings to keep her clean and dry is very good. She will do just as well outside in an individual pen. A 4- by 8-foot pen with a roof over one-half is fine. Also, a calf can be tied to a roofed 4- by 4-foot pen that is open on one side. The grain and hay are fed in racks inside the pen.

As soon as she is 3 months old and no longer is fed milk, the calf is ready to be put in a community pen with not more than 10 other calves. If put in a community pen while receiving milk, calves get the bad habit of sucking each other.

At 6 months you may put your calf in an even larger pen with about 18 calves. A small pasture close to the home is fine. She must be fed grain and hay each day to keep her growing fast.

At 1 year, she should be able to grow well on good irrigated pasture and plenty of fresh water. If the pasture gets short, feed some hay to keep her growing.

### Identifying Your Calf

Every calf must be permanently identified to be certain there is no mixup of calves. This should be done when the calf is very young so you still can remember who the sire and dam are. Be sure to record all dates and identification of the calf along with the sire and dam names and numbers in your 4-H record book.

**Tattooing** is the best and most permanent method. Be sure the tattoo is put in the ear properly so it is easy to read. Do not have two calves with the same tattoo. Clean the calf's ear carefully before you tattoo it.



Remove the oily secretions.



Smear the ear and points of the stamp with tattoo ink.



Imprint the tattoo.



Rub the tattoo ink into the punctures.



The tattoo is a satisfactory permanent method of identification.

**Eartags** are very good but sometimes they are lost. When the calf is vaccinated for brucellosis (between the ages of 4 and 6 months), the veterinarian will put in an official, metal eartag. Permanent official identification is required for Dairy Herd Improvement Association testing.

Neck chains seldom are used on calves because of the danger of getting caught in the pen or fence. Photographs of Holsteins are excellent identification.

### Dehorning Methods

You should dehorn calves because animals with horns may injure other animals and might injure you. Do this when the calves are small and as soon as you can feel the horn button. Calves without horns have a good appearance if the job is done well. Most show animals are dehorned.

**Electric dehorning** is a clean and easy method to use. It takes a special piece of equipment

for the job, an electric dehorning iron. It does not hurt the calf as much as you may expect. As soon as the horn button is identified easily by touching it, place the preheated electric iron around the horn and hold down about 10 seconds until the area is deep copper color. The horn may grow if you do not leave the iron on long enough. The calf can be dehorned up to 1 month of age.

**Caustic potash** also does a good dehorning job. It may be purchased in the stick, paste, or liquid form. Cut the hair from the horn area and apply a ring of grease around the horn but about 2 inches away. This helps prevent the caustic from getting into the calf's eyes and causing blindness. Do not get caustic on your fingers as it will burn you.

Caustic potash should be used before she is 3 days old. Rub the end of the stick on the surface immediately over the small horn area. Rub until the skin is red, but do not cause bleeding. Store the caustic in a safe place.





Electric dehorning method.



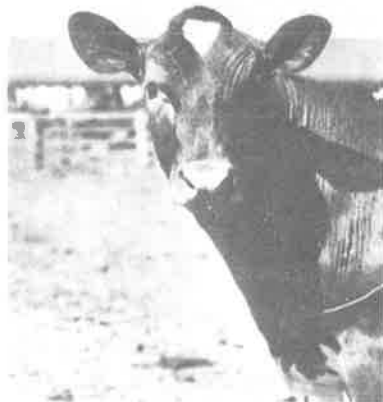
Clip hair from rudimentary horn and surround with grease ring.



Apply caustic.



Horn cells completely destroyed by the treatment.



The result of a shiftless job.



Proper dehorning gives a natural polled appearance.

### Remove Extra Teats

Examine the young calf for extra teats. If she has more than four teats, the extras should be removed. This should be done as soon as you are sure which are the four main teats. If there is any doubt as to which are the extra ones, leave them until later. The extra ones may be clipped off with sharp, disinfected scissors. Paint the cuts with iodine after the teats are removed. There is little pain and almost no bleeding. Extra teats, if not removed, may leak milk or be in the way for milking when she becomes a cow.

### BREEDING YOUR HEIFER

Most heifers freshen when 24 to 30 months of age. There is considerable disagreement as to what age is the best for heifers to calve for the first time. We must consider the weight of the heifer as well as her age. If an undersized heifer is bred, she will make too small a cow. She should be allowed more time to grow before breeding her.

The following table gives the proper relationship between body weight and age for heifers making normal growth. The body weight is a better indication of time of breeding than is age. Normal growth data are not available for Brown Swiss; however they are commonly bred at 21 months of age.

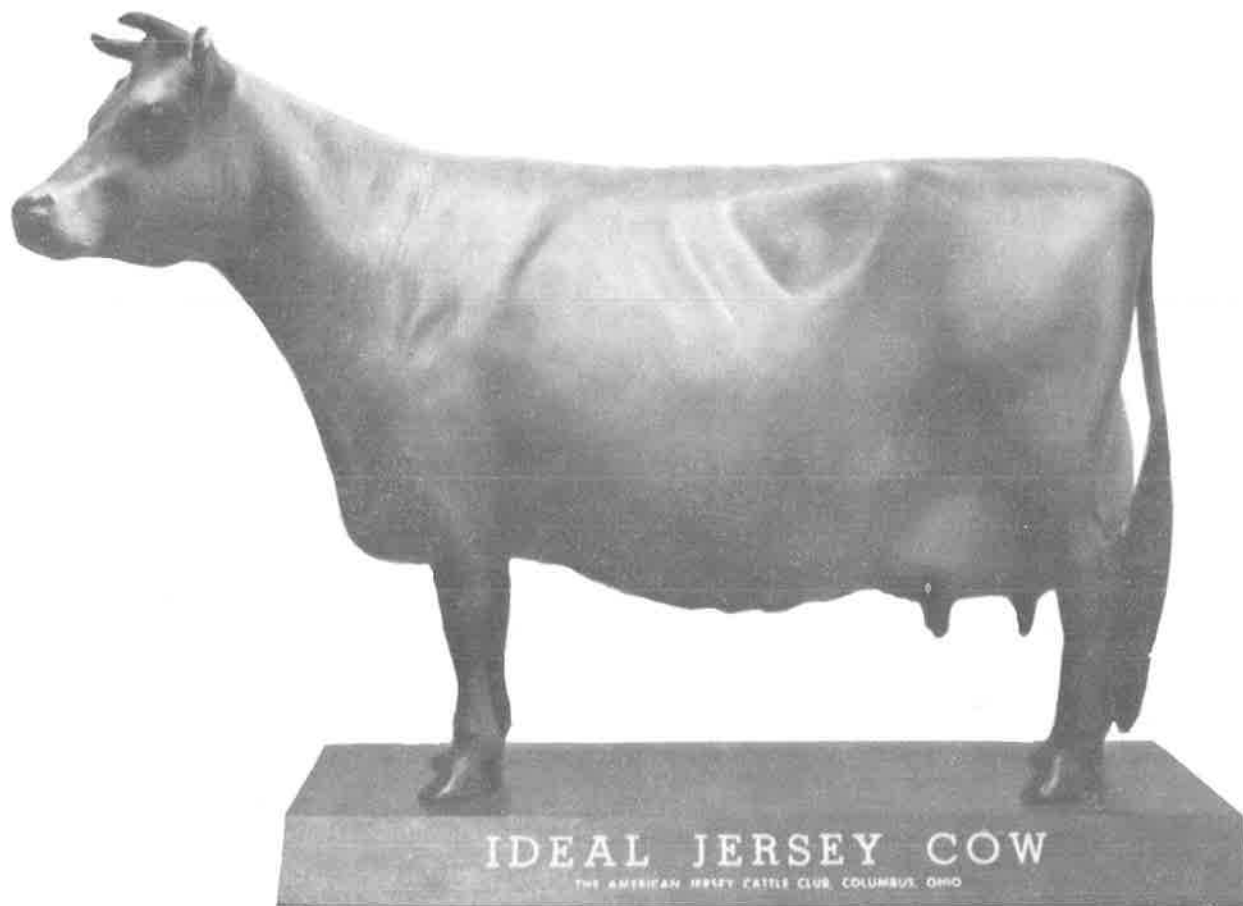
BREED	AGE TO BREED (in months)	NORMAL WEIGHT (in pounds)
Holstein	18 – 20	846 – 912
Ayrshire	17 – 19	697 – 758
Guernsey	16 – 18	605 – 663
Jersey	15 – 17	530 – 580

**Heat periods** occur every 19 to 23 days. A couple of months before your heifer is to be bred, you should watch for her heat periods. Record each one so that you will know when to expect the next heat. A heifer in heat will stand still while another one rides her. If a heifer rides her but she does not stand still, this is a sign that she is either coming into her heat period or is just past the heat period.

**Breed** to the best bull available. Be sure the sire is registered, is of good type, and has a good production pedigree. You may use the bull on your dairy or use the services of one of the artificial breeders' associations serving your area. Record the breeding date so you can tell when to expect the calf.

**Gestation period** is the time a heifer carries a calf. It is the time between her last breeding and the day she has her calf. For heifers, the gestation period is about 9 months and 10 days. For older cows it is nearer to 9 months.

## YOUR DAIRY COW



### CARE AT CALVING TIME

Two months before calving, check the condition of your heifer. If she has been properly fed she will be in good flesh. We do not want her roly-poly fat, nor should she be thin. Her ribs should be well covered.

Continue to feed her all the top quality forages she will eat. If she is not in good flesh, start feeding her some grain—2 or 3 pounds a day of rolled barley or a prepared dairy cow ration. One month before freshening, increase this to 5 or 6 pounds if she needs still more flesh.

Good flesh is necessary, because after she freshens she must continue to grow for most

of 1 year and produce milk. She needs some reserve flesh to draw from if she does both jobs well.

Remove the heifer from the others a week before calving. In the summertime, a clean grassy area is the best place for her. In the winter, you may want to put her in the barn in a clean pen with plenty of bedding.

At calving time, leave her alone unless she is having trouble. In case of trouble, call on someone with experience, perhaps your veterinarian. When the calf is born, there may be a membrane over its nostrils. Remove this immediately so the calf will not suffocate. In cold weather, wipe the calf dry with a cloth.



The navel cord should be disinfected with iodine to prevent infection. Do this soon after birth to keep germs from entering this opening. Clean the calving area. If cow and calf are both healthy, leave them together for 3 days so the mother can lick the calf dry and so the calf may nurse.

**Colostrum milk** is the first milk from a cow that has just had a calf. It is a thick milk of orange color. It is very important that the newborn calf drink this colostrum milk immediately and for the first 3 days. This milk contains special germ-fighting material. It is a laxative and gives the calf necessary strength to fight off diseases and to start growing. If the calf has not nursed within 3 hours after birth, she may need some help and will not have full benefit of the colostrum milk.

Feed the cow some grain, starting with 5 or 6 pounds, and increase the amount a little each day after calving until she reaches the amount recommended for her. Full-feeding grain too soon may make her go off her feed. Feed her all the roughage she will eat.

Trouble sometimes occurs after calving. Most of the time you will have to call in experienced help, but you should know what to expect.

The **afterbirth** normally should be removed within 6 hours after giving birth. If it remains longer than this it is called a "retained afterbirth." This should be removed by an experienced person, such as a veterinarian. If this is not done properly, it may cause injury to the cow. Many cows fail to milk well because of trouble resulting from a retained afterbirth.

**Milk fever** may occur among high-producing cows. It is caused by a lack of calcium in the blood. First symptoms are staggering and lack of control of the hindlegs. Soon the cow will lie down with her head turned back onto her side. She may become paralyzed and unconscious. Prompt injection of a calcium solution in a vein by a veterinarian usually brings rapid recovery.

A **congested udder** or swollen udder often occurs. In most cases this congestion or hard udder is normal. Do not increase the grain until the swelling is gone. Milk the cow three or four times a day as long as the udder is hard and inflamed. Keep the cow in a warm, dry place and massage a few times to help get the liquid to leave the udder.

## FEED REQUIRED BY YOUR DAIRY COW

Before you try to set up a ration for your cow, you should learn something about feed nutrients and the function of each. You need to know what nutrients a cow requires and the amount of each. The most important ones will be discussed here.

### Protein

Protein is important for growth of the animal as well as for milk production. If she is not fed sufficient protein, she cannot grow or make large quantities of milk. Good alfalfa hay is an excellent source of protein. Cows fed alfalfa hay as their only source of forage usually will receive all the protein they need.

Cottonseed meal, linseed meal, soybean oil meal, and coconut oil meal are high in protein. One or more of these often are added to the grain mixture as a source of protein for the calves and cows.

### Carbohydrates

Carbohydrates provide the energy needed to produce milk. Some carbohydrates are used in growth and some are stored in the body as fat. Grains are high in carbohydrates. Some of the most common are barley, corn, milo, oats. Grains usually are fed to animals to give them more energy than they can get from the forages such as hay, pasture, green chop, and silage.

### Fat

Fat is an excellent source of energy. A pound of fat contains two and one-fourth times as much energy as does a pound of carbohydrates.

### Minerals

Minerals are very important for our dairy animals. A large number of minerals are necessary for growth, production, and reproduction. Most of them are needed in very small amounts and are readily supplied by the feed the cattle eat. Some of the more important ones that we are concerned about will be discussed here.

**Salt** must be supplied to cattle of all ages. It is fed free-choice in the pens or corrals and put in the grain mix. One-half pound of salt to 100 pounds of grain is the usual amount. Salt can be fed in the pen in the block form or granular form.

**Calcium** is found in large quantities in milk. Calcium also is needed for healthy strong bones. Calcium seldom will be short if a milk cow receives at least half of her forage in the

form of good alfalfa. Pasture and hay will supply sufficient calcium for growing calves.

**Phosphorus** is found in large quantities in most grains and high protein feeds. Most forages are low in phosphorus. This mineral is an important part of the bones and is necessary for many functions of the body. Growing calves receive sufficient phosphorus from their normal feeding programs. Cows in milk need larger amounts and often do not receive enough phosphorus from their normal ration of grain and forage. Extra phosphorus can be added to the ration in the form of bone meal, dicalcium phosphate, monocalcium phosphate, and sodium phosphate.

### Vitamins

Vitamins are very important for dairy cattle, but usually are found in good supply in the normal ration. Seldom is it necessary to add vitamins to the feed for heifers or cows.

**Vitamin A**, or carotene, is needed for the health of the cow and for her to produce thrifty calves. High quality, green alfalfa hay contains large quantities of carotene that the cow can change to vitamin A to supply her needs.

**B complex vitamins** are made by the bacteria in the rumen (stomach) of the animals. Even though the feeds are low in these vitamins, the cow makes her own. They are called B complex because several different but related vitamins are included in this group.

**Vitamin C** is made in the body tissue of the animal. It is not necessary that the feed supply this vitamin.

**Vitamin D** often is referred to as the "sunshine vitamin." It is needed for proper growth of bones and teeth. Sunshine and field-cured hay supply plenty of this vitamin for cattle.

**Vitamin E** is needed for proper function of the reproductive organs and to prevent oxidized flavor in milk. It is plentiful in our grains and green leafy forages such as hay and pasture.

**Vitamin K** is needed so the blood may clot after an injury. If this vitamin is lacking, an animal may bleed to death from a small cut. Alfalfa leaves are rich in this vitamin. The bacteria in the rumen make sufficiently large amounts of vitamin K to supply the needs of the animal.

### HOW FEED IS DIGESTED

Horses and pigs have one stomach, similar to humans. Cattle, sheep, and goats have four parts to their stomachs and are referred to as ruminants. The first compartment is the largest and is called the rumen or paunch. The second is the reticulum or honeycomb, third is the omasum or manyplies, and the fourth is the abomasum or so-called true stomach.

The cow chews her food very little as she eats. Coarse feeds, such as hay and silage, go into the paunch and stay there until she is ready to chew her cud. Rumination is the process of

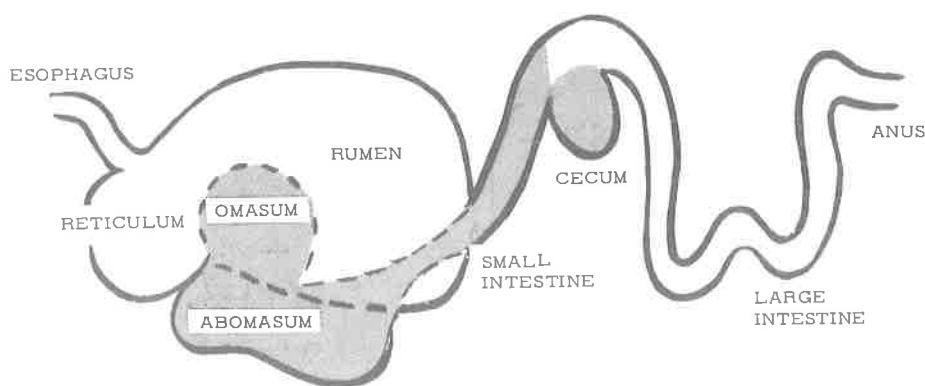
bringing a mass of coarse food, or cud, up from the paunch into the mouth to be chewed. When the food is chewed sufficiently, it goes back into the paunch. From there it goes into the reticulum, on to the omasum, and into the abomasum. In the first, second, and third stomachs, the food is mixed vigorously and squeezed to help break up the particles of food. In the fourth or true stomach, the digestive juices go to work to break down the feed into its various parts so it can be used by the animal.

In the rumen are many kinds of bacteria that predigest or ferment the fibrous part of the forages. It is this bacterial action in the rumen that makes it possible for cattle to use large amounts of forages.

Some of our latest research shows us that much of the feed that enters the rumen passes through the rumen wall as fatty acids after fermentation in the rumen and the reticulum. The rest passes through the third stomach and into the true stomach for further digestion.

Most grains follow the same route as roughages. After fermentation in the rumen or reticulum, they also pass into the third stomach and then on into the true stomach for further digestion.

### ESSENTIAL PARTS OF A RUMINANT STOMACH



## HOW FEEDS ARE USED

Feeds are rated by the total digestible nutrients (TDN) they contain. We often speak of a feed having 50 percent TDN, as in alfalfa hay, or 78 percent TDN, as in barley. This refers to the total amount of nutrients the animal is able to digest and utilize. Much of the nutrients is lost in the digestive process and only a small part actually is usable by the animal to grow or make milk.

Net energy is the part of the feed energy that goes into production of milk, growth, body maintenance, and to provide energy for body movements. On the average, only about 20 percent of the total energy a cow eats can be used for these things.

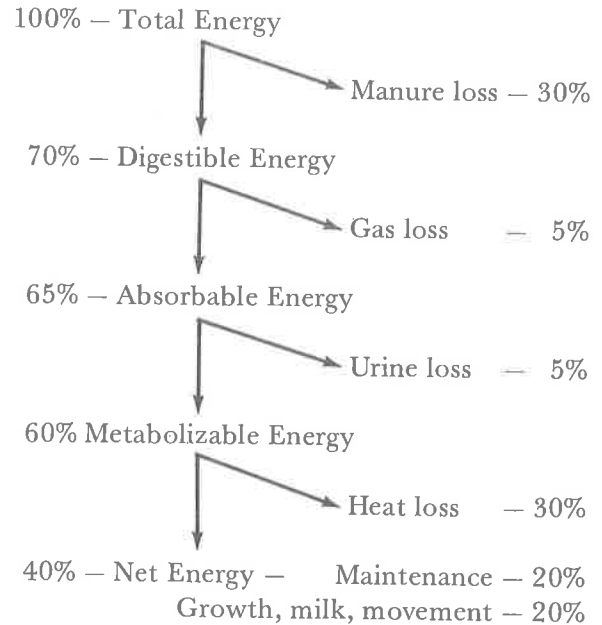
About 40 percent of the total energy is lost in the manure. The remainder is called digestible energy. About 5 percent of this is lost in the form of gases that a cow burps up; and the 55 percent that is left is called absorbable energy.

About 5 percent of the absorbable energy is lost in the urine. By this time half of the energy is lost. The half that remains is called metabolizable energy. Another 30 percent is lost in the form of heat. This heat is a result of metabolic reactions associated with utilization of the feed, and the cow must get rid of it. In the summer this heat may cause the cow

to be uncomfortably warm. In the winter this heat may help to keep her warm.

The 20 percent that is left is called net energy and is available to be used for growth, maintenance, or production. Only about one-fifth of the feed a cow eats is available for production—the other four-fifths is lost during the process of digestion.

The following graph shows the breakdown of energy from the cow's feed. (These are approximate percentages of the total energy showing losses from a cow fed forages free-choice plus grain.)



## FEEDING YOUR DAIRY COW

### Some Rules of Thumb

1. A milk cow will eat 3 pounds of hay or hay equivalent for every 100 pounds of body weight. A 1200-pound cow will eat about 36 pounds of hay per day.
2. It takes 3 pounds of silage to equal the dry matter in 1 pound of hay. It takes 4 pounds of green chop to equal the dry matter in 1 pound of hay. A cow's stomach is not large enough to digest only silage or green chop and produce a lot of milk. Hay usually is fed along with some silage, green chop, or pasture.
3. Feed grain or concentrate mixture according to the cow's production. The following formula will help you to decide how much grain to feed each day:

$$\frac{(\text{monthly fat} - 30)}{2} = \text{pounds of concentrates to feed daily}$$

If your cow produces 60 pounds of fat monthly, then,

$$\frac{(60 - 30)}{2} = 15 \text{ pounds of concentrates daily}$$

If you are using electronic data processing of records in your dairy, you can use this formula:

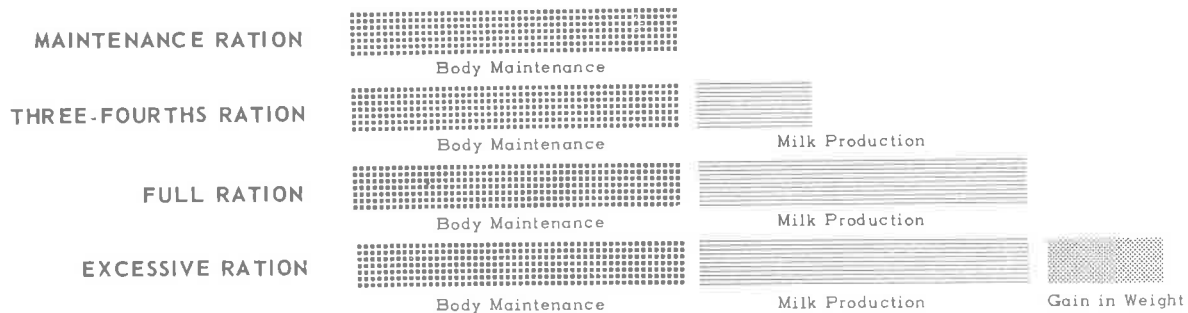
$$(\text{daily fat} - 1.00) \times 15 = \text{pounds of concentrates daily}$$

If your cow produces 2 pounds of fat daily, then,

$$(2 - 1.00) \times 15 = 15 \text{ pounds of concentrates daily.}$$

(Since you will feed the cow at each milking, you would feed half the amount or 7.5 pounds twice a day.)

4. Feed grain according to production, but also keep in mind the cow's condition of flesh. If a cow is near the end of her lactation and is thin, feed her extra grain. She should put on weight so she can produce at her best during the next lactation.





## Top Quality Feeds Are Best

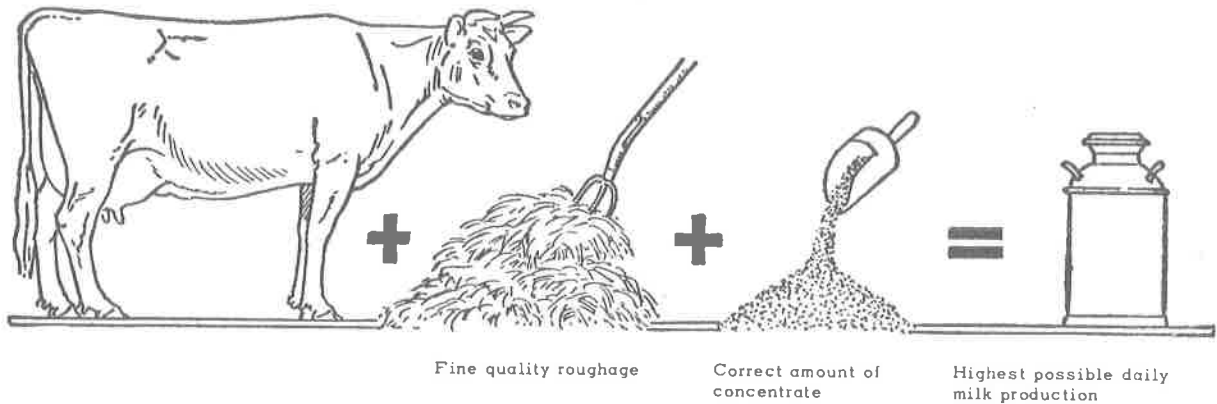
If you expect your milk cow to produce her best, feed her only top quality forages and grains. Milk production goes down when poor quality hay is fed. Poor hay has less nutrients per pound, but even more important, cows do not like poor hay and will eat less. The less she eats the less she produces.

Top quality forages, hay, silage, green chop, and pasture usually are excellent sources of nutrients for our cattle. Usually a cow will eat about 8 pounds of grain plus her forage without reducing her consumption of forage. If you feed more grain than this, you can expect some reduction in the amount of forage eaten. High grain feeding usually brings the highest production.

Prepared commercial grain mixtures usually are fed to milk cows. It may be a high or low protein mix. It usually contains recommended amounts of salt and phosphorus. Rolled barley is usually the main ingredient.

Cows fed alfalfa hay will get all the protein they need. If corn silage is fed, they must depend on getting some protein from the grain.

Twelve to fourteen percent of crude protein in the grain mix is usually sufficient. When corn silage or oat hay is fed, the protein in the grain should go to 20 or 24 percent. Grain mixes do not need many kinds of feeds in them. Buy the feeds that will give you the most nutrients per dollar spent.



Feed your cow top quality forage and grains for highest milk production.

## THE MILKING PROCESS

### The Mammary System

The cow's udder is filled with many very small milk factories called alveoli. The blood flows through the udder and the alveolus takes out what it needs to make milk. It is then stored in the udder until milking time.

When the cow is ready to be milked, she secretes a let-down hormone (oxytocin) in the blood system. When the oxytocin reaches the udder it causes the milk to be let down into the lower part of the udder and teats. If the cow becomes frightened while being milked, she will secrete a different hormone, adrenaline. This causes the cow to hold up her milk. If this happens, you will not be able to complete the milking process until the cow again lets her milk down.

### Milking the Cow

There are several makes of milking machines on the market. They all will do a good job if they are properly installed and kept in good operating condition. The milker must know how to operate the machine and always use the best methods, or he may cause injury to the cow.

#### For Best Milking Procedure:

- Stimulate the cow's udder by gently massaging while you wash her. Do this about 1 minute before you put on the machine.
- Milk a stream from each teat to be sure the milk is of good quality.
- Apply the machine only after the cow has let down her milk.

Average Composition Of Some Dairy Feeds

Feed	% Moisture	% Crude protein	% TDN	% Fat	Net energy for lactation (NE <sub>1</sub> ) (Mcal per lb)	% Calcium	% Phosphorus
<b>Forages</b>							
Alfalfa hay	10.0	17.0	52.0	1.9	0.53	1.47	0.24
Oat hay	12.0	8.1	48.0	2.7	0.49	0.23	0.21
Corn silage	70.0	2.4	20.4	0.8	0.21	0.08	0.06
Alfalfa, fresh before bloom	80.0	4.0	12.4	0.7	0.13	0.45	0.07
<b>Concentrates</b>							
Barley, PCS	11.0	9.5	73.0	1.9	0.76	0.04	0.32
Oats	9.0	9.2	70.1	5.4	0.73	0.09	0.33
Beet pulp, dried	9.0	7.3	71.0	0.6	0.74	0.68	0.10
Corn	11.0	8.9	78.3	3.9	0.82	0.03	0.28
Milo	12.0	12.0	72.7	3.0	0.76	0.03	0.30
Cottonseed meal	8.0	41.2	69.0	2.0	0.72	0.16	1.21
Cocoanut meal	8.0	21.3	68.1	2.4	0.71	0.17	0.61
Molasses	25.0	3.2	54.0	0	.56	0.89	0.08

From the 5th Edition, *Nutrient Requirements of Dairy Cattle*, National Research Council. A megacalorie (Mcal) is a million calories. It is a measurement of heat or energy used to compare food value of various feeds.

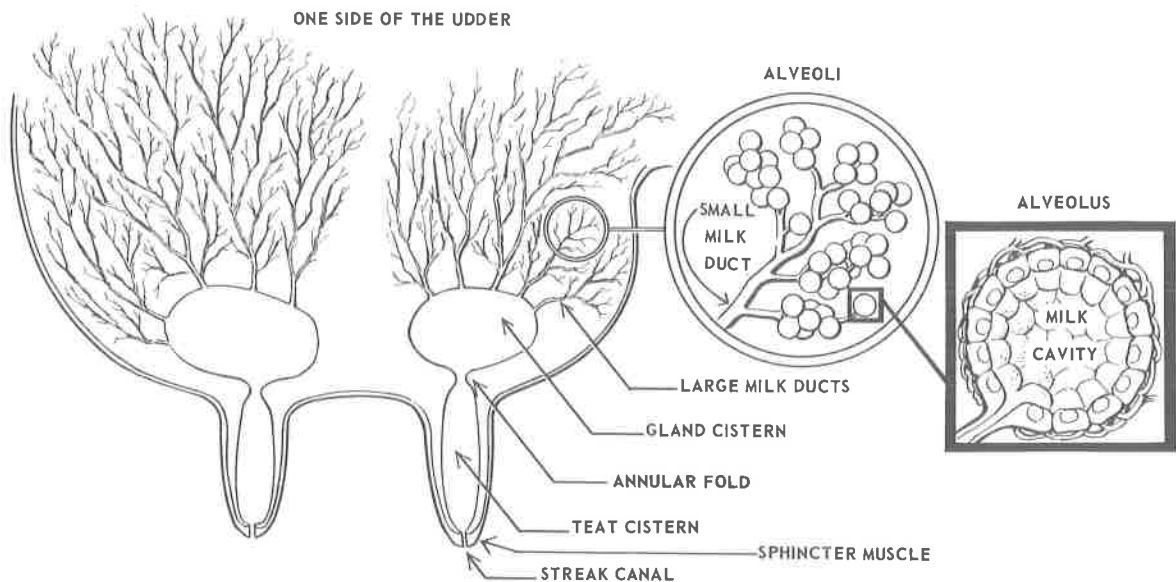
- Remove the machine as soon as she is finished milking. Machine stripping is recommended just before taking off the machine. Do not overdo this.
- Treat the cow gently. Do not hit or kick her. She will be less excited if you are gentle.

**Mastitis** is an infection in the udder. It usually is caused from an injury and is present in varying amounts in almost every herd of milk cows. The California Mastitis Test (CMT) may be used to test the milk for evidence of udder infection.

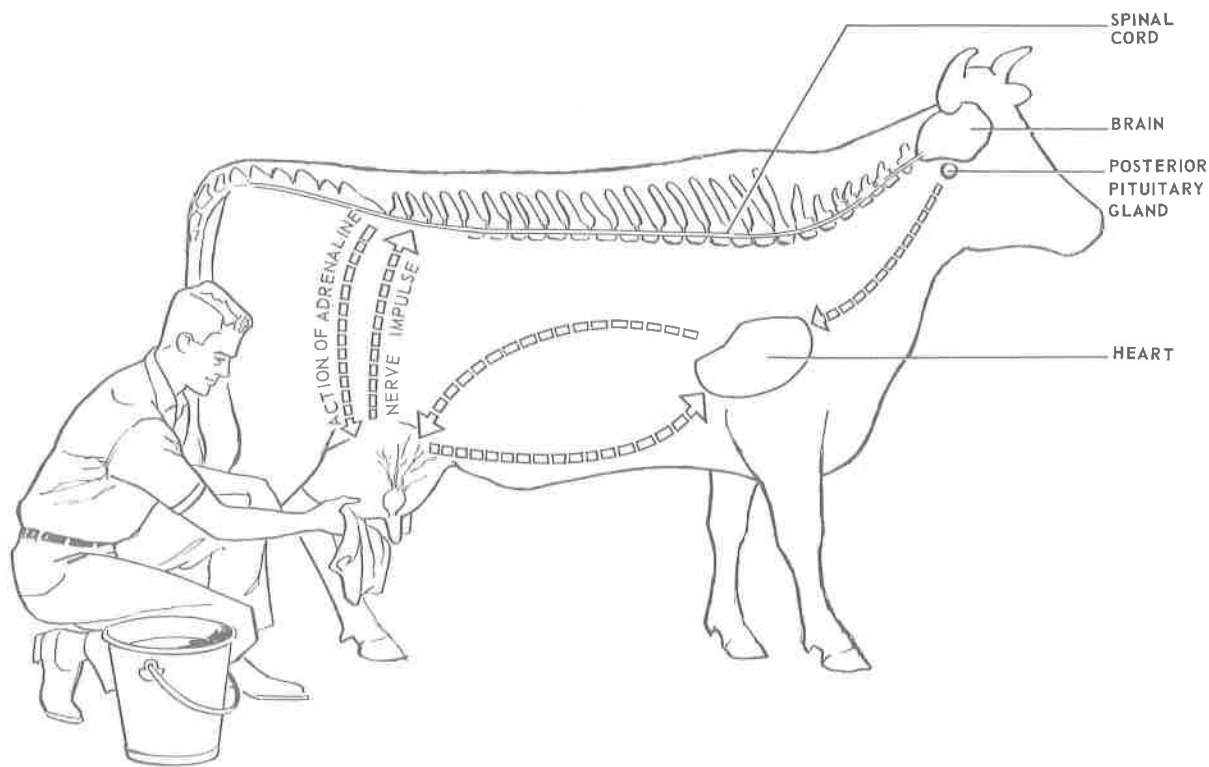
Lumpy or stringy milk is an indication of a bad case of mastitis. In most cases of mastitis, the milk appears normal. Mild cases may be found by using the CMT test. These are some

suggestions to follow to keep mastitis at a minimum:

- Be sure the cow is properly stimulated before applying the machine.
- Remove the machine as soon as the cow is finished milking.
- Narrow-bore stretch liners are the easiest on the cows' teats.
- Be sure the vacuum level is as recommended.
- Be sure the vacuum pump has sufficient capacity to do a good job of milking and maintain a constant vacuum level.
- Remove any obstacle in the corral or barn that could cause injury to the udder.



Milk is produced and stored in the alveoli until the letdown hormone reaches the udder. The milk then passes through the small milk duct, through the large milk duct, gland cistern, teat cistern, and into the streak canal.



When the udder is stimulated, nerve impulses pass through the spinal cord to the brain. A series of nerve impulses from the brain stimulate the posterior pituitary gland which secretes the milk letdown hormone (oxytocin). The blood stream carries this hormone to the udder alveoli muscles which contract and force the milk into the gland cistern. Excitement or pain will cause adrenaline to be secreted. This hormone overcomes the action of the milk letdown hormone and causes the cow to "hold up" her milk.

## KEEPING RECORDS ON YOUR COW

### Production Records Are Important

It is important that you keep good records of your cow's milk production. You need this information so you can decide how much grain she needs. You want to know if she is making you a profit or just paying for her feed.

If your parents are members of the local Dairy Herd Improvement Association (DHIA) you can get excellent records from them. If these are not available, weigh the milk to get 1 day's production. This will not give you her percentage butterfat test or her fat production by the month.

In the average herd, a cow must produce nearly 500 pounds of butterfat in 10 months just to pay her share of the total dairy costs.

### Keep Your 4-H Record Up To Date

A good 4-H member, like a good businessman, keeps good records on income and expenses. Good records on your cow include such things as calving date, information on calf, breeding date and sire used, feed and labor cost, income from the sale of milk, and many others. Complete records help you to make correct management decisions. This is true for 4-H members as well as dairymen with many cows.



### BREEDING YOUR COW

Cows are the most profitable when they have a calf every 12 or 13 months. They milk 10 months and are dry 2 months. A cow carries a calf for 9 months. To come out right, the cow should be bred 2 months after she has a calf. A good rule to follow is to breed the cow on the first heat period after she has been in milk for 60 days. To get the necessary 2 months as a dry cow, you must stop milking her 7 months after her last breeding date.

Select the best sire available to breed your cow. He should have good type, good pedigree, and he must be registered. The calf gets half of its characteristics from the sire and half from the dam.

#### Milk Cows Need a Rest Period

After a cow milks heavy for 10 months, she needs a rest. It takes a lot out of her system during this time. Often a cow must draw on

reserves in her body for energy, minerals, and vitamins while she is producing milk. If she is to be an even better producer the next lactation, she must have time to build up those reserves.

She has been carrying a calf for 7 months, and much of her feed is used to grow a big healthy calf. During her 2-month dry period she must put on flesh. This is a reserve for the next lactation.

Dry cows should be separated from the milking cows. Feed them 4 pounds of grain a day for the month before calving. If the cow is not in good flesh, she needs this grain during the full 2-month dry period.

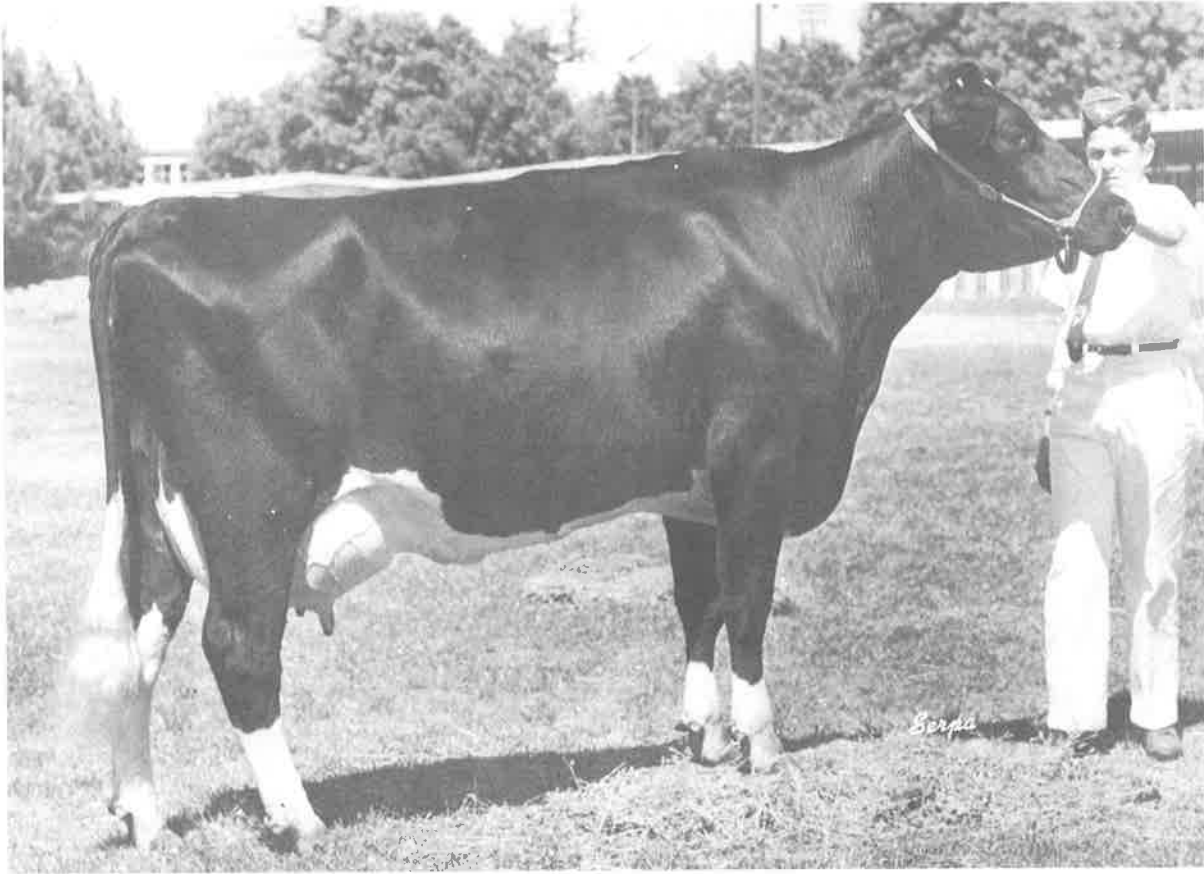
### DISEASES CAN BE COSTLY

Dairy animals sometimes get sick. Always watch for symptoms that indicate the cow is not feeling her best. Sometimes you can hardly tell it and other times they become very ill. Some indications that something may be wrong are: Milk production down, scours, does not eat much, looks lazy and listless, hunch-backed and walks lame. Separate her from the group as soon as you notice trouble. Watch her carefully and call the veterinarian if the symptoms continue.

Some health problems can be prevented or treated by you or your father. Flies, lice, foot rot, and cattle grubs should be treated when first noticed. Mastitis can be treated, but the best control is prevention.

When treating milk cows for flies, lice, or mastitis, be sure to follow instructions for use of the chemical. If not used properly, the chemical may get into the supply of milk we drink. Your 4-H leader or farm advisor will give you more information on what to use. (Also see pages 8 and 9, calf health pointers.)

# TRAINING, FITTING, AND SHOWING



Fair time offers the opportunity for a dairy project member to display his animal and compare it with other animals. When project animals are on exhibit, they should be shown at their best. Many people form their opinions of 4-H work from the exhibits they see. Every boy and girl should try to give the best possible impression by having a good exhibit.

You are being judged, as well as your animal. The type and conformation of your animal give the onlookers an impression of its quality, but the way the animal is fitted and shown tells them the kind of boy or girl the animal has for an owner.

You are not attempting to fool the judge when you do a good job of fitting and

showing. You are simply showing that you are proud enough of your animal to want her to look her best when she is out in public.

## TRAINING

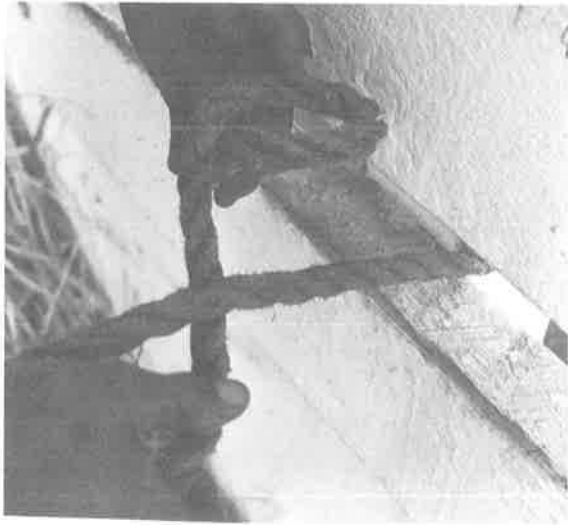
An animal can be taught to lead when it is only a few days old. A calf will never forget even a few lessons.

### Tying Your Animal

First, a calf must get used to being tied. Tie her up for 4 to 6 weeks prior to the first fair at which you will show.

Learn the proper way to tie your animal. The animal should be tied not too short to cramp her movements in getting up and down, nor so long that she can get tangled up in the rope. She must be tied securely as well.

If the animal is green and overly frisky, tie her in the stall and give her a handful of grain. Brush her gently on the back and loin and on the sides. Talk to her. Work slowly with her and she may not “spook” at all.



Step 1. Make a loop in the tie rope



Step 2. Make another loop in the free end



Step 3. Put this loop through the first loop



Step 4. Put the free end of the rope through the second loop



Step 5. Pull it tight and it is secure

## Teaching Your Animal To Walk

The first step in teaching your animal to lead and pose is to show her that her halter puts her completely under your control when you are walking her.

You may start with a rope halter. They are cheaper and you can even make it yourself. However, they have the disadvantage of chafing the calf under the jaw, and if they get wet they shrink, causing more discomfort. A leather halter is more durable and more comfortable and not too much more expensive. The show halter, also made of leather, is too expensive for daily tie-up. It should be used and kept at its best for fairs and field days.

You cannot teach your animal to lead by pulling her along, she is stronger than you are. For the first few days have your father, sister, or brother help you. Take a firm grip on the halter and walk your calf slowly. Have your assistant follow her to urge her a bit from the rear. If you have no help and have to work alone, never try to pull her along from the front. Put on the halter, then stand back toward her rump and urge her forward by pinching her tailhead. As she walks forward, go along with her.

Train the animal to walk with short steps, slowly and with spirit, head and ears up. Hold the halter lead strap short with the left hand, and slow the animal down by pushing back with the right hand just above the shoulder joint.

Don't wait until the show day to teach the calf to lead. A walk on the halter every day soon teaches the calf to come along without pulling back. It's the little time spent every day that counts.

### Leading

You have tied your animal, and taught her how to walk. Being tied has taught her the

meaning of restraint. Now, you are going to teach her control—how to lead and pose according to your instructions.

Start by leading her to water. You lead her, don't let her lead you. Your forward pull on the halter means to come, and when you stop, she is to stop. Keep a firm grip on the halter strap, and never let the lead strap drag, or you or she may step on the end of it. Hold the lead strap in your left hand, close the halter, with the excess strap coiled in your hand. Walk slowly backward, having your right hand free to stop her. Keep your right hand or fingertips lightly on her neck, and when you hold back on the halter to stop her, slide the tips of your fingers stiffly in between her neck and shoulder. She will associate the holding back of the halter and the pressure of your right hand with stopping. Repeat the "come" and "stop" procedure; your animal learns faster by frequent repetition.

### Posing

Don't every reach back with your foot to try to change position of one of her hind feet. This will put you off balance. Use the halter and shoulder control to signal her to move back half a step.

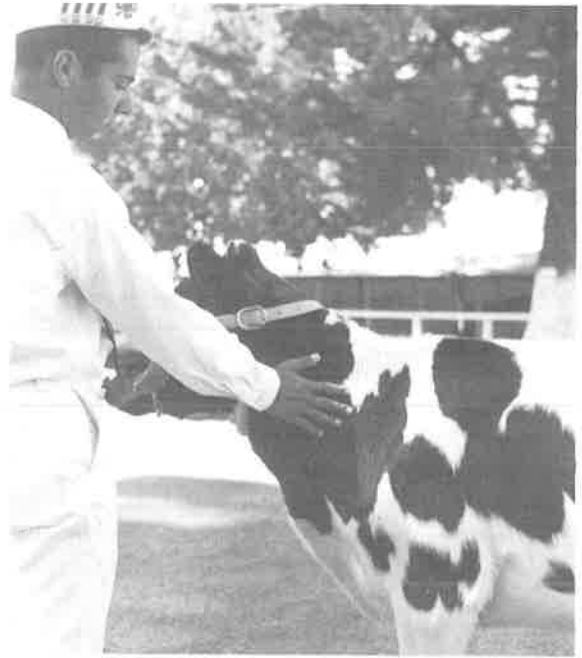
Be sure to teach her to stop and stand squarely with her front feet, so that either hind foot can be moved forward or backward, depending on where the judge is standing. When showing a cow, keep the hind foot on the judge's side a half step forward. When showing a bull or heifer, the hind foot closest to the judge is slightly to the rear. Avoid posing your animal downhill at all times.

During your training period you will learn to correct any posture faults of your animal. A weak loin can be somewhat corrected by slightly bunching her feet under. If she humps her loin, a pinch will aid in lowering it after you have posed her "stretched out."



Do not “overshow” your animal. This means drawing attention to yourself and away from your animal. Overshowing also will make your animal nervous. Constant jiggling of the lead chain also will cause nervousness in the animal. Keep calm and alert, and once your animal is posed, let her alone.

You can teach your animal to lead and pose with a daily exercise period of at least 20 minutes. Be proud of your animal’s performance in the show ring. It will reflect patience and good training on your part.



Put your hand on her neck to stop her.



Hold her securely by the halter with the left hand.



It may be necessary to place your fingers firmly in her shoulder to train her to stop or to get her to put her feet in place.

## FITTING

When we groom an animal, we change her from a dirty, long-haired individual into a bovine beauty queen, bringing out her quality and adding to the softness of her hide. Grooming can be easy and pleasant work. It begins when you have finished halter-breaking and training your animal.

### Washing the Hair

The steps to a good washing job are:

- Soak your animal thoroughly with water that is not too cold.



- Protect her ears so water doesn't get in them.
- Apply soap and scrub thoroughly with a good stiff rice-straw brush. Use whichever soap you believe does the best job on your animal.



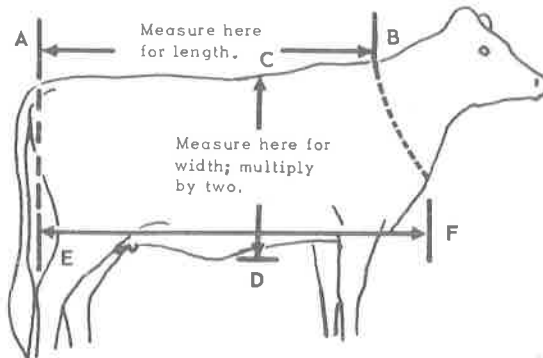
- Rinse with clear water and scrape off excess water with your hand. If the animal still is not clean, wash her again. Even yellow stains will come out if enough soap and elbow grease are used. Remember, the longer you let manure and dirt soak into your animal's hide and hair, the more permanently it will stain.



- Clean the feet with a stiff brush.

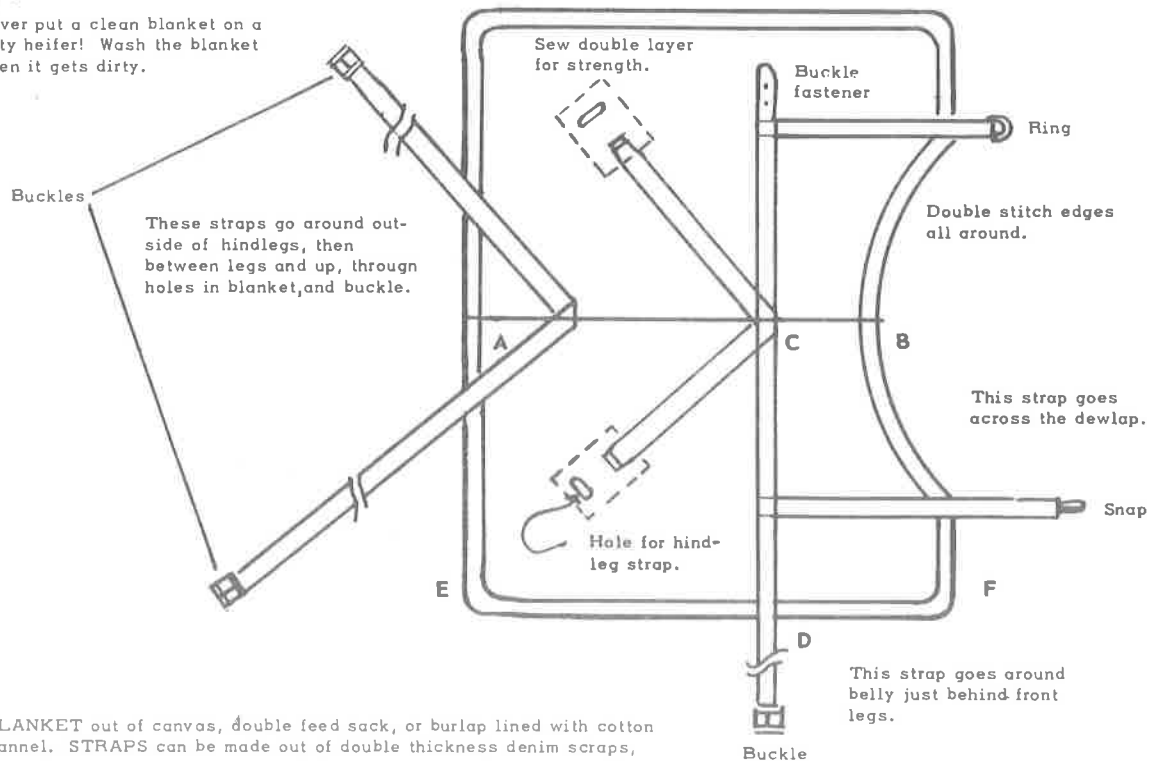


- Dip the tail into a bucket of soapy water, rub it, and squeeze the switch in your hands. Rinse the switch with clear water and snap out the water. Bluing added to your water will help bring out the white in a switch. But do not use an excessive amount of bluing in the water.



Never put a clean blanket on a dirty heifer! Wash the blanket when it gets dirty.

- Cover her with a clean blanket until dry—and the hair will set in place.



BLANKET out of canvas, double feed sack, or burlap lined with cotton flannel. STRAPS can be made out of double thickness denim scraps, etc. Make blanket extra strong. Make straps adjustable and keep them tight to prevent tearing.

## Grooming

When your heifer is dry, start brushing and grooming. Go over her first with a rubber currycomb to loosen the old hair. Follow with a stiff brush to carry off what the comb has loosened. Some exhibitors like to use a hacksaw blade to draw off the long hair. If you are too rough, you will raise welts on the skin.

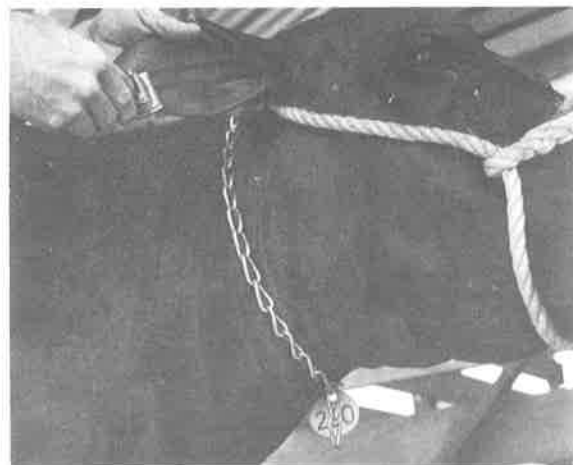
Hard rubbing is necessary to bring out the natural skin oil. If you do this twice daily, you won't need to "oil" your animal on show day. "Be a good groom and your animal will really bloom!"

## Clipping

After your animal is washed, she is ready for her first clipping. Do not wait until the last minute. Clip at least 1 month ahead of time to give the sharp edges of the clip pattern a chance to blend smoothly. You clip your animal to make her look refined, smooth, and sharp. On most heifers, only the head, neck, and tail will need clipping. Clip the tail against the grain of the hair. Clip from just above the

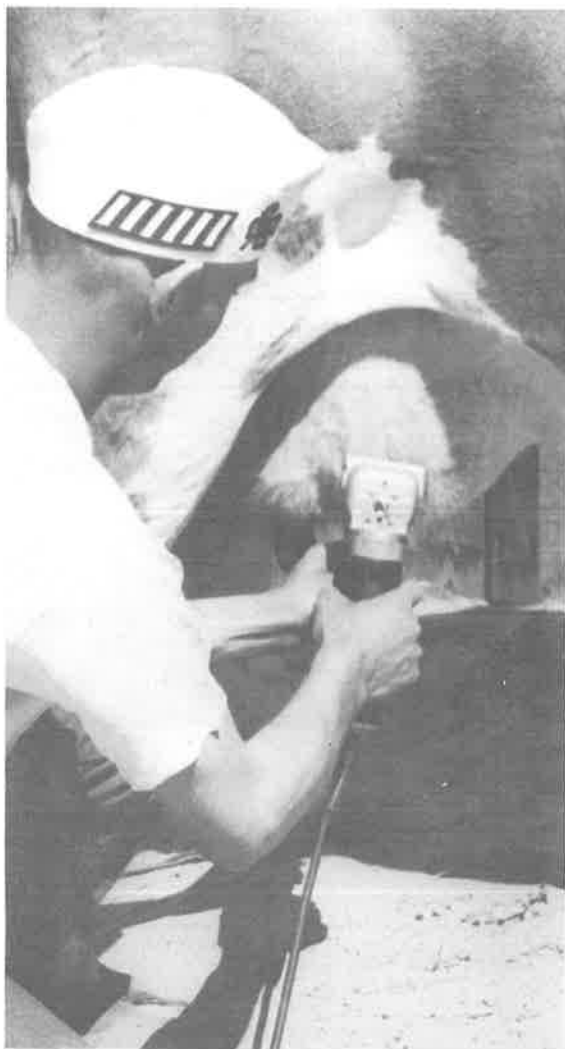
twist (the point at which the thighs come together at the back of the animal) to the tailhead. When clipping the tailhead, take the hair off the top only. Try to make the topline look as smooth and as straight as possible. If there are low spots in the topline just ahead of the tail setting, leave the hair long in the depression and clip it short on the high areas. When clipping the shoulders, clip from the point of the shoulder to the top of the shoulders, following the widest point of the shoulder blade.

A clean, close clipping over the face will remove the thick and fuzzy whorls of long hair over her poll and face. Clip the insides of her ears. The neck may be clipped all over or just along the top.



Trim the legs, particularly the hocks and hindlegs, to make them look clean and flat. Don't clip the leg more than an inch or so above the hock.

Never clip the belly, or underline, on bulls and heifers. Leaving this hair gives the appearance of greater body depth. On cows, clip the sides of the udder up to the body attachment. Also clip the fore attachment if it is good. Clip the rear udder to where it joins the body.



No two animals will be clipped alike, since no two animals will have exactly the same faults in conformation. A good job of clipping can overcome or minimize many faults.

## SHOWING

### Filling

Just before you enter the ring, you will "fill" your animal. This means putting enough extra feed and water into your animal to make her look extra good. There are several ways to put on a fill, but the main idea is to make her hungry and thirsty just before showing, so she will eat and drink more than usual. We know when our calf has had enough fill by watching the hollow under her loin fill up and out on the left side, at the same time springing her ribs.

Half an hour before show time, set a bucket of beet pulp in front of your animal. After she has eaten it, and before she is led into the ring, give her some water. Too much water will cause a water bloat which will make her appear "potbellied." A beet pulp and hay fill gives her stomach something to work on for a long time. Experiment at home with filling, and by fair time you should have a good idea of how much fill will make her look extra good.

At fairs, the water is strange to them, so many animals do not fill properly. If possible, test your animal a day or two before showing. Feeding extra salt will make her thirsty and encourage her to drink.

### Milking Your Show Cow

If your show animal is a milking cow, you must time her milking so she will show her udder at its best.

A cow in full milk will appear at her best and most natural with about 12 hours of milk in her udder. As the cow's milking period tapers off, it takes longer for milk to accumulate in the udder. This method of letting the milk accumulate to "show" the cow at its best is called "bagging up."

Be careful not to overbag your cow. Also be sure to balance out her quarters. This requires considerable skill. Consult your father or your leader before you prepare your cow for the show ring.

### **Conduct in the Show Ring**

All the work, time, and effort you put into your animal is preparation for the short length of time you will be in the show ring.

You are wearing your official 4-H uniform, your animal is at its best, and your class has been called to enter the show ring.

Lead your animal in a clockwise direction. Locate the judge and always be aware of him and his signals. Pay close attention to your animal. Hold the halter strap properly—close to her jaw, your right hand ready to control your animal's movements—and walk slowly backward. Keep a full length between you and the animal ahead. If the exhibitor following you bumps your animal, do not show anger. Control yourself at all times, thus exhibiting good sportsmanship.

Watch for the judge's signals; he expects you to be on the beam. He will probably feel your animal's hide for quality. He may ask you her age or birthdate. If she's a bred heifer, he may want to know how long she has been bred, or when she is due. If she is a cow, he may want to know when she was fresh. As a good showman, you should know these answers.

Watch the judge for his signal to bring your animal in line. It is very embarrassing to miss the call to pull in and line up.

As you pull in line, do not brush the animals already lined up, but don't leave too much room either. Put your animal in a straight line with those already in line. A straight line is more attractive than a zigzag line. Set your animal up to look her best and pay attention to her at all times. If you have to switch places in line, do it with the least disturbance. Either lead her around the end of a short line, or in a double "S" curve, forward and back through the line, and forward to her new position. Stand in line and receive your ribbons with thanks, listen to the judge's reasons, and keep showing your animal until you get out of the ring. A word of congratulation to the winner is always in order.

## DEMONSTRATIONS

Demonstrations provide a fine opportunity for 4-H members to show and tell others about recommended practices in dairying. You will learn to plan, and combine words with action, to get training in public speaking, to teach others what you have learned, and to show others one of the values of 4-H work.

Demonstrations should be a part of project and club meetings. Every member should have an opportunity at least once each year to plan and present a demonstration. Refer to the manual on 4-H demonstrations for instructions on how to plan and present a demonstration.

Here are some suggested subjects for dairy demonstrations:

- How to make a rope halter
- Teaching the calf to drink
- Teaching the calf to lead
- Points to consider in selecting a dairy heifer, cow, or bull
- Methods of feeding the dairy calf
- Feeding the dairy cow for production
- How to keep milk production records
- How to control cattle grubs
- How to control cattle lice
- How to construct a calf pen
- Methods of dehorning calves
- Fitting dairy animals for show
- Registration of animals
- Tattooing or ear-tagging animals
- Selecting quality hay
- Factors in maintaining good animal health
- Proper cleansing of milking equipment
- How a cow digests its feed
- Control of mastitis
- Selecting cattle by pedigree
- Control of flies
- Proper milking procedures
- A pasture management program
- Making a calf blanket
- Culling dairy cows
- How to make silage

Suggested subjects for dairy demonstrations — continued

Feeding green-chopped hay

Types of records used in a progressive dairy

How to keep 4-H dairy records

How to clip a milk cow

Types of milking barns

Differences between a healthy animal and a sick one



