DAIRY MANUAL
FOR 4-H CLUB MEMBERS
Circular 619
UNIVERSITY OF ILLINOIS
COLLEGE OF AGRICULTURE
Extension Service in Agriculture
and Home Economics
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PARTS OF A DAIRY COW


Urbana, Illinois

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Cooperative Extension Work in Agriculture and Home Economics: University of Illinois, College of Agriculture, and the United States Department of Agriculture cooperating.
H. P. Rusk, Director. Acts approved by Congress May 8 and June 30, 1914.
well-planned 4-H Club dairy project offers you many fine opportunities. If you stay with the project until you have cows in production, you will have learned the basic principles of dairying, picked up a great deal of practical information, and had valuable experience.

Some of you may find in a dairy project a chance to build up a business of your own. A number of 4-H Club members in Illinois who chose to work on the dairy project now have their own herds and businesses. A boy from Kankakee county, for instance, began a dairy project with a Guernsey calf when he was ten. He had a herd of thirty-two animals last year and had increased his production of butterfat from a herd average of 301 to 430 pounds. Now at nineteen, he has his own herd and a good start in his chosen business.

Of course, not all of you who enter a dairy project will choose to make dairying your business, nor even if you do, will you be able to go into it on as large a scale as did this boy. But what you learn from a dairy project will make you a better farmer and a better businessman.

GENERAL PROJECT REQUIREMENTS

Age. Any boy or girl 10 years old and not yet 21 as of July 1 of the current year can be a 4-H Club member and choose a dairy project.

Application. You can become a club member by filling out an application card. This card can be obtained from your local 4-H Club leader or from the farm adviser of your county.

If your first dairy project is to be the dairy-production project, you may give your card to the local leader and start anytime between October 1 and December 31 of the current year.
For the dairy heifer project, January 1 of the current year is the deadline. For the dairy calf project May 1 of the current year is the final date.

**Care of animals.** You must personally own and care for the animals used in your project.

**Records.** You will be required to keep a record of the kind, amount, and value of all feeds fed, of all money received and spent, and make notes on how you care for your calf, your heifer, or your herd. A book in which to keep these records will be furnished by your leader.

**Exhibit.** Every year you will be required to exhibit at least one of your club animals at a local or county 4-H Club show arranged by the local or county 4-H Club committee.

**Turn in record.** You will submit the complete record of your project (your completed record book) to your local leader by September 1, the end of the club year. The leader will then give this record to the farm adviser, who will return it to you after he has included it in his summary of the projects for your county.

**HOW TO BEGIN**

**Decide what breed you want to work with.** This is the first thing to do after you have enrolled in the local club. If you like one breed best, it is a good idea to choose it. If you have no real preference, you will find some advantage in selecting your calf or your heifer from the breed that is most numerous in your community.

**Decide which project you want to enter.** You can undertake any one of three projects: the calf project, the yearling heifer project, or the dairy-production or herd project. Before making up your mind, you will want to think over the situation on your home farm and choose the project that will fit best into the farm business.

Your age and experience will help you to make your choice. If you are old enough to have taken some responsibility for feeding and managing dairy cattle, you might like to choose the dairy-production project. The income from the milk or cream

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For illustrations on pages 17, 29, and 30, the authors are indebted to the Public Service Company of Northern Illinois.
will make it possible for you to start early to pay off your debt for your stock.

If you have had only a little real dairy experience, you will want to enter the calf project. You won’t have to invest so much in your animal, the requirements are lower, and you will have a chance to get experience while your calf is growing up.

**Calf Project**

**Start not later than May 1.** The calf must have been born after July 1 of the previous year. While it can be as young as you wish it to be, it is best for it to be not less than three months old, which would mean that it would be born not later than February 1 of the year you start your work.

**Use either a heifer or a bull calf.** Most club members choose heifer calves. A bull calf can be used but it must be a purebred registered calf. Also, choosing a bull calf means observing some special rules. You can get these rules from your farm adviser.

The use of a bull instead of a heifer calf may be best suited to boys and girls living on farms where there is not a good purebred sire. The calves are usually shown and sold at public auctions not later than October. This arrangement gives a club member a way to get his money out of his calf and gives his father a chance to buy it for the home herd.

When a bull calf is used, it is desirable to select one born as soon after July 1 of the previous year as possible.

**Yearling Heifer Project**

**Start not later than January 1.** The heifer project may be a continuation of the calf project, or you may buy a yearling heifer. The heifer must have become a year old between July 1 of the previous year and January 1 when the work starts. If you buy a heifer, your project should start on the day you buy it.

**Dairy-Production Project**

**Continues yearling heifer project.** Usually club members who have completed the yearling heifer project go on to the dairy-production project. But, if you wish to start with the dairy-production project, you may. This project is also known as the
herd project because once a heifer starts to produce calves she will normally continue to calve, thus increasing the number of animals you may expect to own in succeeding years. Furthermore, you may want to buy animals to add to your project.

**Enrollment dates vary.** If you bring a yearling heifer into the dairy-production project from the heifer project, you should start not later than October 1. If you start in 4-H Club work with the dairy-production project, you may enroll between October 1 and December 31; the project requires that one or more animals be in production for three or more months during the project.

**Records.** Besides keeping track of the amount of feed used for the heifer, you must keep a monthly milk and butterfat record from the date the heifer freshens. Directions for keeping these records are given on pages 16 and 17.

**SELECTING CALVES**

Most members start the dairy project with a calf. If you start your project with a calf, you will need to study carefully how to select the right kind of animal, for your success will depend a lot on this first step.

**Get advice in buying your calf.** Talk with some one who knows desirable dairy type, prices, and where you can get a good animal. Your father may give you this help, or you can see a local cattle breeder, the farm adviser, or the local vocational agriculture teacher.

Club members usually buy a calf locally when they can. Of course, you will want to buy one that you feel is priced right and is of the right type. You will also want one that has good inheritance and good health.

If you can’t find such a calf in your community or county, you can usually get one in the state. If you get it from your father’s herd, buy it just as you would if you got it from some other herd. If it is a purebred, see to it that you are listed as the owner on the records of the breed association. If you do not know where to get the kind of calf you want, write to the Dairy Department, University of Illinois, Urbana, for help.
Guard against disease. When you select your calf, be careful not to get one that has been exposed to tuberculosis and brucellosis (Bang's disease). You can guard against both diseases by buying your calf from herds that are accredited as free from them and by buying on condition that the calf shall pass a 30-to 90-day retest for these diseases.

Keep your calf in quarantine until it has been retested and you know that the tests were negative. If you buy your calf from a herd infected with brucellosis, it will be best to have it vaccinated between the time it is 4 and 8 months old.

Select a Heifer Calf of Good Family

Choose a calf that will make a profitable dairy cow and a good foundation animal. Club members do not always agree on what kind of calf makes a good one for club work. Some, thinking that appearance in the ring is more important than the price they have to pay and evidence of ability to produce, want a calf that will stand at or near the top in the show ring. Others want a calf of good type from a cow with a good production record — they are more interested in building up a good herd than in taking prizes in the show ring. Still others are willing to get along with a very ordinary calf if it is cheap.

To get a calf of ideal quality — one that you can be quite sure will develop into a profitable dairy cow and become a good foundation animal — you will have to choose one with excellent ancestry. These are the qualifications for an ideal heifer calf:

1. It is a purebred as well as a good individual.
2. It was sired by a proved bull.
3. It is by a dam that was the daughter of a proved bull.
4. It is by a dam that has a mature record equal to 500 pounds or more of butterfat a year made on twice-a-day milkings.
5. It is by a dam that has one or more daughters with maturity records equal to 500 pounds or more of butterfat made on twice-a-day milkings.
6. It is by a sire and a dam that are both good individuals.
7. It is from a family that has good udders.

To get a calf of good quality. Only a few club calves, of course, are likely to measure up to the ideal just described. You may have to take a good one rather than an ideal one. Your
chances of getting a good one will be pretty high if you pick one that has quality and good ancestry. These are the qualifications for such a calf:

1. It is a good individual.
2. It was sired by a son of a proved bull.
3. It is from a dam that under good farm care has a mature record equal to 400 pounds or more of butterfat a year made on twice-a-day milkings.
4. It is from a sire and a dam that are both good individuals and that come from families with good udders.

**Study the record of the calf’s dam.** To improve their herds, good dairymen study the production records of their cows. Then they use these studies as one of their guides when they have to decide what stock to keep and what they had best get rid of. Comparison of what the dam and the other cows in a heifer-calf’s family have produced at maturity is one of your surest guides to a good calf.

When you study records of production, you look especially at the number of pounds of butterfat the cows produced in a year (a good cow should give at least 400 pounds). Have these questions in mind: (1) Were the records made on twice-a-day milkings or on more frequent milkings? (2) How often were the cows fed? (3) How old were the cows when the records were made? Good cows milked three times a day and properly fed will usually give 15 to 20 percent more milk than when they are milked twice a day. As a rule heifers with a first or second calf will not give as much as they will when they reach maturity (six to eight years).

If the dam of the calf you are thinking of buying is a heifer, find out how much milk you can normally expect her to give when she is mature and milked three times a day. The figures in Table 1 (page 9) will quickly show you about what she will produce. This is the way to work out this problem:

1. Put down the total number of pounds of milk the heifer produced during her lactation period.
2. Turn to Table 1. Find age of heifer in left-hand column.
3. Follow this line across the table until you come to the column showing her breed.
4. Put down the figure you find here; then multiply the heifer’s total production by this figure. The answer is the heifer’s expected production as a mature cow milked three times a day.
Example. Suppose you have a chance to buy a calf whose mother is a 3½-year old Holstein heifer. In 305 days she has given 11,378 pounds of milk on three-times-a-day milking. Her milk has averaged 3.7 percent butterfat, so that during the 305 days she produced 421 pounds of butterfat. How much will she produce when she is mature?

Go to Table 1 and get the figure given for a 3½-year old Holstein: 1.131. Multiply 11,378 pounds by 1.131 and you get 12,868.5 pounds, the amount of milk the heifer will give when she is mature and milked three times a day. If her milk continues to average 3.7 percent butterfat, she will produce 476 pounds of butterfat.

Multipliers to Use to Find the Number of Pounds of Milk a Young Dairy Cow Will Produce at Maturity (Table 1)

Multiply the pounds of milk the young cow produced during her lactation period by the figure given for her age and breed.

<table>
<thead>
<tr>
<th>Age at Calving</th>
<th>Brown Swiss, Ayrshire, Guernsey, Jersey multiply by:</th>
<th>Holstein multiply by:</th>
<th>Mixed Breed multiply by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yrs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.538</td>
<td>1.262</td>
<td>1.377</td>
</tr>
<tr>
<td>2½</td>
<td>1.400</td>
<td>1.195</td>
<td>1.275</td>
</tr>
<tr>
<td>3</td>
<td>1.286</td>
<td>1.141</td>
<td>1.203</td>
</tr>
<tr>
<td>3½</td>
<td>1.196</td>
<td>1.099</td>
<td>1.131</td>
</tr>
<tr>
<td>4</td>
<td>1.136</td>
<td>1.063</td>
<td>1.077</td>
</tr>
<tr>
<td>4½</td>
<td>1.088</td>
<td>1.037</td>
<td>1.035</td>
</tr>
<tr>
<td>5</td>
<td>1.052</td>
<td>1.020</td>
<td>1.017</td>
</tr>
<tr>
<td>5½</td>
<td>1.028</td>
<td>1.008</td>
<td>1.006</td>
</tr>
<tr>
<td>6</td>
<td>1.012</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>6½</td>
<td>1.006</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>7</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>7½</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>8</td>
<td>1.000</td>
<td>1.018</td>
<td>1.036</td>
</tr>
<tr>
<td>8½</td>
<td>1.000</td>
<td>1.012</td>
<td>1.018</td>
</tr>
</tbody>
</table>

Since cows milked and fed three times a day give more milk than those fed and milked twice a day, your next step is to find out how much the heifer will give on twice-a-day milking when she is mature. To find out, turn to Table 2, page 10:

1. Find the line in the column on the left which includes a 305-day milking period.
2. Follow this line over to the milked three-times-a-day column and get your figure, .8333.
3. Multiply 12,868.5 pounds (the amount produced at maturity) by .8333. The answer, 10,723 pounds, is what the heifer will normally produce at maturity in 305 days on twice-a-day milking.
Multipliers for Reducing Records of Frequently Milked Mature Cows to What Their Production Would Be on Twice-a-Day Milking (Table 2)

<table>
<thead>
<tr>
<th>Find total number of days your cow was milked</th>
<th>If your cow was milked 3 times a day, multiply by:</th>
<th>If your cow was milked 4 times a day, multiply by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 to 15</td>
<td>.9003</td>
<td>.9831</td>
</tr>
<tr>
<td>16 to 25</td>
<td>.9830</td>
<td>.9721</td>
</tr>
<tr>
<td>26 to 35</td>
<td>.9776</td>
<td>.9614</td>
</tr>
<tr>
<td>36 to 45</td>
<td>.9713</td>
<td>.9500</td>
</tr>
<tr>
<td>46 to 55</td>
<td>.9652</td>
<td>.9406</td>
</tr>
<tr>
<td>56 to 65</td>
<td>.9591</td>
<td>.9306</td>
</tr>
<tr>
<td>66 to 75</td>
<td>.9531</td>
<td>.9208</td>
</tr>
<tr>
<td>76 to 85</td>
<td>.9472</td>
<td>.9111</td>
</tr>
<tr>
<td>86 to 95</td>
<td>.9414</td>
<td>.9017</td>
</tr>
<tr>
<td>96 to 105</td>
<td>.9356</td>
<td>.8925</td>
</tr>
<tr>
<td>106 to 115</td>
<td>.9299</td>
<td>.8834</td>
</tr>
<tr>
<td>116 to 125</td>
<td>.9242</td>
<td>.8746</td>
</tr>
<tr>
<td>126 to 135</td>
<td>.9187</td>
<td>.8659</td>
</tr>
<tr>
<td>136 to 145</td>
<td>.9132</td>
<td>.8573</td>
</tr>
<tr>
<td>146 to 155</td>
<td>.9077</td>
<td>.8490</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Find total number of days your cow was milked</th>
<th>If your cow was milked 3 times a day, multiply by:</th>
<th>If your cow was milked 4 times a day, multiply by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>156 to 165</td>
<td>.9024</td>
<td>.8408</td>
</tr>
<tr>
<td>166 to 175</td>
<td>.8971</td>
<td>.8328</td>
</tr>
<tr>
<td>176 to 185</td>
<td>.8918</td>
<td>.8249</td>
</tr>
<tr>
<td>186 to 195</td>
<td>.8866</td>
<td>.8171</td>
</tr>
<tr>
<td>196 to 205</td>
<td>.8815</td>
<td>.8096</td>
</tr>
<tr>
<td>206 to 215</td>
<td>.8764</td>
<td>.8021</td>
</tr>
<tr>
<td>216 to 225</td>
<td>.8714</td>
<td>.7948</td>
</tr>
<tr>
<td>226 to 235</td>
<td>.8665</td>
<td>.7876</td>
</tr>
<tr>
<td>236 to 245</td>
<td>.8616</td>
<td>.7806</td>
</tr>
<tr>
<td>246 to 255</td>
<td>.8567</td>
<td>.7736</td>
</tr>
<tr>
<td>256 to 265</td>
<td>.8520</td>
<td>.7668</td>
</tr>
<tr>
<td>266 to 275</td>
<td>.8472</td>
<td>.7601</td>
</tr>
<tr>
<td>276 to 285</td>
<td>.8425</td>
<td>.7536</td>
</tr>
<tr>
<td>286 to 295</td>
<td>.8379</td>
<td>.7471</td>
</tr>
<tr>
<td>296 to 305</td>
<td>.8333</td>
<td>.7407</td>
</tr>
</tbody>
</table>

If as a mature cow she continues to give milk that averages 3.7 percent butterfat, her yield of butterfat will be about 397 pounds. Tho a cow that gives about 400 pounds of butterfat is not a high producer, she is a satisfactory one, and on the basis of her production you would be justified in buying her calf.

Each time you buy a calf study the production record of the dam and of the other cows in the calf’s family. Your goal is to increase your production of butterfat. Remember that while a cow that gives 400 pounds of butterfat a year is a good cow, an excellent cow gives 500 pounds or more.

Choose Heifers With Characteristics of Good Cows

Heifers and heifer calves are undeveloped, and consequently there is not as much to see about them as about mature cows. They have some of the same characteristics as good cows, however; therefore if you know how to pick a cow of good dairy type, you can learn how to choose heifers and heifer calves.

Characteristics of a good dairy cow. In a good dairy cow, look for these things: (1) a stylish appearance, (2) an open conformation, (3) a roomy digestive system, and, (4) a good udder and mammary system.

Stylish appearance. A dairy cow which has the following features is stylish:
1. A feminine-looking head
2. A clean-cut neck, free from throatiness
3. Shoulders that blend nicely with her body
4. A strong, straight back and loin
5. A long, level rump with the tailhead set smoothly between the pinbones
6. Straight hind legs
7. Thin, incurving thighs
8. A well-proportioned body
9. A large, well-attached udder

Open conformation. A cow’s frame or build is called her conformation. A dairy cow which is open in conformation is one which has clean features about the head, a fairly long, thin neck, clean-cut shoulders, sharp withers, a prominent backbone, hips, and pinbones, and ribs that are open or well apart.

A roomy digestive system. A good dairy cow needs a roomy digestive system. A deep, wide middle or barrel, and a wide, strong muzzle show she has it. A cow with a rounded, shallow body will not have a roomy enough digestive system to take care of as much food as she will have to eat to be a good cow. A dairy cow is a manufacturing plant. She changes large quantities of rough feeds, such as pasture, hay, and silage into valuable human food. A good dairy cow has to have room enough to handle these feeds if she is to give a great deal of milk.

To digest lots of feed, a good dairy cow needs a heart, lungs, arteries, and veins that are well developed. She must have a wide, deep chest to let her heart and lungs develop.

Since the milk she produces is carried in her udder, she needs one that is large and well attached. If there is anything seriously wrong with it, she will not be as useful and valuable as she ought to be. A good cow almost always has a capacious udder. And it should be of good quality, not meaty and coarse. When it is milked out, it should hang in loose, pliable folds. It should be attached high and wide behind, be reasonably level on the bottom, and carried well forward and smoothly attached to the body. The teats should be large enough for hand-milking and well placed on each quarter.

A good udder and mammary system. A cow’s udder, milk veins, and milk wells are known as her mammary system. The
FIVE MAJOR BREEDS OF DAIRY CATTLE

The five cows pictured here are outstanding representatives of their breeds. All have exceptionally good mammary systems: note the splendidly attached and capacious udders, well-placed teats, and the veining on udders and abdomens. All show the triangular conformation desired in dairy animals; that is, a straight top line and a bottom line that tilts upward toward the front. The clean-cut heads and necks, thin thighs, and open ribbing indicate outstanding dairy character.

The heifers should all develop into promising cows. They have the lines, the conformation, and the clean-cut heads and necks that characterize good dairy animals. Notice that all have depth of body, alertness, “feminine” looking heads, straight lines, good legs, and general balance.
milk veins running forward from her udder on her abdomen carry her blood from her udder to her heart. Large veins, milk wells, and veining on her udder indicate that there is a large circulation of blood thru her udder.

Look out for the defects listed below:

<table>
<thead>
<tr>
<th>Lack of dairy type</th>
<th>Body shortcomings</th>
<th>Poor mammary systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse, compact bodies of beef type</td>
<td>Narrow, shallow chests</td>
<td>Udders are —</td>
</tr>
<tr>
<td>Coarse, steery heads</td>
<td>Low backs</td>
<td>Coarse and meaty</td>
</tr>
<tr>
<td>Short, thick necks</td>
<td>Low, narrow loins</td>
<td>Small and short</td>
</tr>
<tr>
<td>Heavy, coarse, open shoulders</td>
<td>Badly sloping rumps where the pinbones are much lower than the hip bones</td>
<td>Narrow and attached low at rear</td>
</tr>
<tr>
<td>Coarse bone structure</td>
<td>Narrowness at pinbones and thurls</td>
<td>Low-hanging and badly quartered</td>
</tr>
<tr>
<td>Thick, rounding thighs</td>
<td>Coarse, heavy tailheads</td>
<td>Poorly developed fore or rear quarters</td>
</tr>
<tr>
<td></td>
<td>Shallow, rounding bodies</td>
<td>Pull away from abdomen</td>
</tr>
<tr>
<td></td>
<td>Crooked hind legs</td>
<td>Very large or very small teats</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Look for style, conformation, and barrel in heifers and heifer calves. The mammary system in a heifer calf is not developed. Moreover, a heifer does not show as much angularity as a dairy cow. Your good heifer calf, however, will have the same style, conformation, and the deep, wide barrel and chest that you find in a good cow. An alert heifer with a clean-cut head and neck, a deep body, and a straight, strong back and rump will usually develop into a good cow.

Buyers often turn down calves because they are thin and not as attractive as those which carry more flesh. Don’t let lack of condition keep you from buying a calf that promises to become a good cow. Flesh and finish is one thing and good dairy type another. Don’t confuse the two.

**Insure Your Calf**

As soon as you have bought a calf or one has been born into your herd, protect yourself against its loss. Always insure it. You may use one of two kinds of insurance:

1. You may become a member of a cooperative insurance company. The cooperative plan provides that every member shall
When choosing a heifer for your Club project, it is sound dairy practice to compare her with her dam. In that way you can get an idea of the kind of animal your heifer is likely to develop into.

You may also pay 8 to 10 percent of the original cost of the animal into a county sinking fund. If you should lose your calf, your loss is paid from this fund.

2. You may insure your calf with a livestock insurance company. Your coverage should date either from the time you buy your calf or from the time it is born. This is important, for if you buy a calf, your loss might occur before it is delivered to you. Most companies will not insure a calf for more than $100. You can get more information about insurance from your farm adviser.

**KEEP ACCURATE RECORDS**

As a club member, you will get a book in which you can keep an accurate record. The book includes tables from which you can get all the information you will need for various dairy projects: calf, heifer, and dairy-production. It tells you how to keep a good record and is planned so that, if you have more than one animal in your project, you can keep all the records in one book.
If you are a member of a dairy-production project, you may also get forms suitable for keeping daily milk-production records. You may get both the book and the forms from your farm adviser.

**Keep your feed separate.** If you are a beginner, you will need to know how to keep your feed record. The best and easiest way is to keep a two weeks' supply of feed in a special box or barrel. Then, when you add a supply of grain to the box, weigh the feed you add and put its weight in the proper table in your record book. If you are careful to put your feed weights in the right table, you will find keeping an accurate feed record easy.

Don't try to feed your calf from the supply kept for your father's herd.

**Let production record be your guide.** When your heifer has freshened, your record will require more attention. It will show how much milk and butterfat your heifer produces during the year. Her production record can guide your feeding. If you have more than one animal in your project, keep a separate record for each one in production. Keep a record of all young animals in one record book.

A good dairyman uses his records to improve his herd. You will need your records for the same purpose. You will find the discussion on pages 8 to 10 helpful when you have to decide whether to keep or discard an animal.

**To measure production.** One of your most important jobs as a producer of dairy products is that of measuring the amount of milk and butterfat your cow gives. The first thing to do is to get the equipment you need. You will have to have a 30- or a 60-pound milk scale that will weigh down to one-tenth of a pound; a half-pint fruit jar with a tight-fitting lid; and some preservative, such as formalin.

Each time you milk, weigh the milk and write the weight on the barn sheet. *(The barn sheet will be given to you with your record book and other forms.)*

About a week after your heifer has freshened, put a sample of her milk from both the night and morning milkings in your fruit jar and fasten the lid. Before you take a sample, stir the
Keep a record of the amount of milk your cow gives. This is a very important part of any plan for improving a herd.

Milk thoroly by pouring it from one pail to another three or four times. Unless you do this the result of the test will be misleading and you will not get accurate figures for the percentage of butterfat in the milk.

During the period of her production, take a sample of your heifer's milk once a month on about the same day of the month as that on which you took the first sample. During warm weather, use a preservative, such as formalin, to keep the sample from souring. Ten drops of formalin to a half pint of milk is enough. CAUTION: Formalin is poisonous; keep it away from children.

You can usually get your samples tested at a local cream station, milk plant, or creamery. If your father is in a dairy herd improvement association, the association tester will take your milk samples and figure out how much butterfat your heifer is producing every month. If you have to do your own testing, see your club leader about the testing equipment you will need and find out how to make the tests from him.
Feeding Dairy Animals

When you finish your dairy-calf club project, you will be responsible for feeding new-born calves, heifers 4 to 8 months old, yearling heifers, heifers in milk, and young calves. In the following pages, you will find suggestions for feeding animals of all these ages.

Feeding Young Calves

See that a newly born calf gets the colostrum, or first milk, from its mother. The first milk contains vitamin A and essential foods that the newly born calf needs; it is important that the calf get this first milk.

Leave the calf with its mother for two or three days. Then if it is normal, take it away from her and teach it to drink from a bucket. You will find it easier to teach it to drink from a nipple pail; tho if you do not let it drink too fast, you can use an ordinary bucket. To keep it from drinking too fast, put or hold the bucket about a foot from the ground.

Don’t overfeed. Overfeeding a very young calf is a serious mistake. Guard against it. For the first week, feed ⅔ of a pound of milk for each 10 pounds the calf weighs. During the first week, give the milk in equal feedings three times a day. After the first week you can increase the feed to one pound of milk for each 10 pounds the calf weighs.

Feed skimmilk or dried milk, grain, and hay. Start your calf on whole milk. After it is three weeks old gradually cut down the amount of whole milk you feed it until it is on skim-milk, grain, and hay, or dry calf starter and hay. By the time you get it on skimmilk your calf will be 7 to 10 weeks old. It usually takes 350 to 400 pounds of whole milk to get a calf well started.

Feed your calf grain as soon as it will begin to nibble at it. If you are going to feed it skimmilk, use a grain mixture similar to one of those listed on page 20. If you are going to put it on dry feed, then use a grain mixture that has some dried milk in it. A mixture that has been used successfully in the University of Illinois dairy herd is made up as follows:
When the calves are 3½ to 4 months old, they should be changed gradually to one of the mixtures listed on page 20.

When it is about three weeks old, give your calf all the hay it will eat. Feed the hay in a rack or manger. Early-cut clover, clover and timothy, or properly cured alfalfa are all valuable calf feeds. They have vitamins A and D in them, things your calf needs if it is to be strong. You can also feed green, leafy alfalfa hay, but if you do, you will have to be careful to feed it so that it will not scour your calf.

A calf that gets plenty of early-cut, well-cured hay and whole milk usually has the vitamins it needs. Since cod-liver oil helps to build up resistance to calfhood diseases, you will find it a good plan to add enough to provide 500 units of vitamins. Directions on the container will tell you how much it will take to make 500 units.

See that your calf can always get to salt and to plenty of fresh, clean water.

**Feeding Calves Four to Eight Months Old**

If your calf is well grown when you buy it, you will want to continue to feed it on the same ration that it had been on before you got it. If you don’t have the same feeds, or if it had not been fed a practical ration, you will have to change the ration.

**Feed skim milk.** Skimmilk is such a valuable part of the ration that you can continue to feed it until your calf is 5 or 6 months old. After that age, most calves will make satisfactory growth without it. But if you feed skimmilk to your calf until it is 5 or 6 months old, be sure to get it used to other feeds before you take it to the show. Changing a ration sometimes affects a calf’s digestive system or its appetite. If you should have to put it in the ring when its digestion is out of order or it is off-feed, it will not make as good a showing as it would otherwise.
Feed hay. Feed your calf all the good-quality legume or mixed hay that it will eat. Legume hay is the most important of all the roughages for dairy calves. It gives them the protein, minerals, and vitamins they need for proper growth. If your calf has a tendency to scour when you feed it legume hay, you can cut down the amount of legume hay and add nonlegume (Sudan grass, bluegrass, oat hay, redtop, etc.) or mixed hay to its ration. If you have corn silage, you can feed 5 to 10 pounds of it daily. Don’t feed straw, fodder, timothy, and other poor-quality hays; they are not good for dairy calves.

If you have an older calf that is on good pasture during May and June, it will need very little, if any, hay. Later on during hot weather and fly time, feed legume hay in a comfortable, darkened stall and see that the calf can get to it at any time. Feed grain thru the summer.

Feed grain mixtures. Make your grain mixtures for 4- to 8-month old calves mostly of farm-grown feeds. You will want to use farm-grown feeds as much as possible because they are usually the cheapest. Farm grains, however, do not have enough protein in them. You can make up for the shortage by adding such feeds as bran and linseed or soybean meal.

The grain mixtures given below are recommended for young heifers. You can easily make them at home.

<table>
<thead>
<tr>
<th>Ration 1 Pounds</th>
<th>Ration 2 Pounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground yellow corn</td>
<td>400</td>
</tr>
<tr>
<td>Ground oats</td>
<td>400</td>
</tr>
<tr>
<td>Wheat bran</td>
<td>100</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>50</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>50</td>
</tr>
<tr>
<td>Bonemeal</td>
<td>10</td>
</tr>
<tr>
<td>Salt</td>
<td>10</td>
</tr>
</tbody>
</table>

The amount of grain that you feed daily will depend on the condition and growth of your heifer. You want to keep her in good condition but not fat. A safe rule is to feed one pound of grain a day for the first 100 pounds of her weight and ½ pound more for each additional 100 pounds she puts on. Whether you should add to or lower these amounts will depend on her condition.
Provide water and salt. Be sure that your calf can always get plenty of clean, fresh water. And be sure that she can get clean, pure salt whenever she wants it. It is a good idea to keep it in a box nailed to one corner of her stall.

Feeding a Yearling Heifer

Summer. A yearling heifer (or a two-year old) will make satisfactory growth in the summer on good pasture alone. When the pastures are poor, however, you will need to feed her some legume hay, silage, or grain to keep her in good condition. Legume hay is a good feed to add to her ration when pastures are poor.

Late fall and winter. In late fall and winter feed your yearling heifer legume hay, and if you have it, silage. If you do not have silage, feed her all the good-quality legume hay she will eat. Plenty of green, leafy legume hay will give her the calcium, and most of the protein and vitamins she needs for proper growth and development. If your legume hay is poor or if you have to use nonlegume roughages, feed her \( \frac{1}{2} \) - to 1-ounce of special bonemeal or finely ground limestone every day.

Besides legume hay and silage if you have it, your heifer may need, in late fall and winter, a limited amount of grain if she is to stay in a thrifty condition. Two pounds of grain a day will usually be enough. The same grain mixture that is used for the home herd is all right for yearling heifers if it is carefully balanced to fit the kind and quality of roughage which you have. Some mixtures are suggested on page 23.

These three feeds — legume hay, silage, and a grain mixture — make an almost ideal winter ration for a yearling heifer.

Feeding a Bred Heifer

Give your bred heifer enough to eat so that the calf, when it is born, will be strong and active. And remember that your heifer is not yet full grown. She has to grow to her normal size and carry a calf at the same time.

Don’t let your heifer get thin. She can only do all she has to do if you keep her in good condition. The month before she is to have her calf is especially important. During this last month
the unborn calf is making its most rapid growth. This is the time to add to the hay and grain ration.

Two weeks before the calf is due, take away most of the grain. Leave corn and barley out of the ration entirely. Continue to feed the heifer hay and let her have as much of it as she wants. A good grain ration for this last two weeks is: 1 part ground oats and 1 part wheat bran; or 2 parts ground oats and 1 part linseed meal.

**Feeding Cows for Production**

The way a dairyman feeds his cows makes a difference in the amount of milk they produce and in the profit that he makes. Your aim in your dairy-production project should be to supply high-quality roughage and a balanced grain mixture in large enough amounts to enable the cows to produce at their inherited ability.

**Keep feeds in balance.** Good-quality legume hay and silage, if you have it, can form the basis of a suitable ration for cows from which you want high production, just as they do for the ration of young heifers. Of course, if your cow or heifer freshens during the summer months, good pasture should be her main feed. In winter, besides silage and plenty of good-quality hay, you will need to feed a suitable grain mixture. The best mixture to use will depend on the kind and quality of the roughage you have, on the farm grains at hand, and on the price of protein concentrates, such as linseed, soybean, and cottonseed meals.

If you can give your cows all the bright-green alfalfa hay they will eat, you will not need to include as much protein in the grain mixture as you would if you were to feed roughage of poor quality. That is why you should take the quality of the roughage into account when you prepare a grain mixture.

The grains grown on Illinois farms — corn, oats, and barley — should be used as much as possible in the dairy ration. These feeds, however, are rather low in protein. To build up the amount of protein in the ration, it is usually necessary to mix farm grains with high-protein supplements such as linseed, soybean, and cottonseed meals.

The grain mixtures given below have been planned to meet
the herd’s requirements under various common systems of feed­
ing hay and roughage.

**Legumes, no silage.** If you have no silage but can supply all the good legume hay your cows will eat, feed one of these mixtures; they contain about 12 percent total protein.

<table>
<thead>
<tr>
<th>Ration 1</th>
<th>Ration 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pounds</strong></td>
<td></td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.600</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.400</td>
</tr>
<tr>
<td>Soybean meal</td>
<td></td>
</tr>
<tr>
<td>Linseed meal</td>
<td>.100</td>
</tr>
<tr>
<td>Salt</td>
<td>.17</td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.500</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.300</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>.50</td>
</tr>
<tr>
<td>Cottonseed meal</td>
<td>.50</td>
</tr>
<tr>
<td>Salt</td>
<td>.14</td>
</tr>
</tbody>
</table>

**Legumes and silage.** If you feed legume hay and corn or sorghum silage, use one of these mixtures; they contain about 15 percent total protein.

<table>
<thead>
<tr>
<th>Ration 1</th>
<th>Ration 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pounds</strong></td>
<td></td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.700</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.700</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>.100</td>
</tr>
<tr>
<td>Cottonseed meal</td>
<td>.100</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>.100</td>
</tr>
<tr>
<td>Salt</td>
<td>.26</td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.800</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.500</td>
</tr>
<tr>
<td>Soybean meal</td>
<td></td>
</tr>
<tr>
<td>Cottonseed meal</td>
<td>.300</td>
</tr>
<tr>
<td>Salt</td>
<td>.24</td>
</tr>
</tbody>
</table>

**Roughage of poor quality.** If your roughage is timothy hay, weedy or badly damaged legume hay, corn or sorghum silage, mixed timothy and clover hay, corn or sorghum fodder, use one of these mixtures: they contain about 16½ percent total protein.

<table>
<thead>
<tr>
<th>Ration 1</th>
<th>Ration 2</th>
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</thead>
<tbody>
<tr>
<td><strong>Pounds</strong></td>
<td></td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.500</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.300</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>.200</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>.100</td>
</tr>
<tr>
<td>Salt</td>
<td>.17</td>
</tr>
<tr>
<td>Bonemeal</td>
<td>.11</td>
</tr>
<tr>
<td>Corn and cob meal</td>
<td>.400</td>
</tr>
<tr>
<td>Ground oats</td>
<td>.300</td>
</tr>
<tr>
<td>Linseed meal</td>
<td>.100</td>
</tr>
<tr>
<td>Soybean meal</td>
<td>.100</td>
</tr>
<tr>
<td>Brewers’ grains</td>
<td>.100</td>
</tr>
<tr>
<td>Salt</td>
<td>.15</td>
</tr>
<tr>
<td>Bonemeal</td>
<td>.10</td>
</tr>
</tbody>
</table>

**Feed according to production.** You will want to adjust the amount of the grain mixture that you feed to the amount of milk that your cows produce. Failure to make this adjustment
will either cause you to waste feed or lose milk. Your best guide to the amount of grain to feed is the amount of milk your cows produce every day. Holstein, Brown Swiss, and Ayrshire heifers usually need one pound of grain for each 3½ to 4 pounds of milk they produce daily. Jersey and Guernsey heifers usually need one pound of grain for each 2½ to 3 pounds of milk that they produce daily.

Your dairy cows are usually at their best during May and June, when there is plenty of pasture. Then the conditions for producing milk and butterfat are ideal. The cows like the taste of grass and it supplies the proteins, minerals, and vitamins they need. But even when pastures are good, you will need to feed heavily producing heifers some grain. The grain will keep them from losing flesh as quickly as they otherwise would and it will help them to produce better throughout their next lactation period.

**A good mixture to feed during the early pasture season is 2 parts of ground corn or barley to one part of ground oats.**

If your heifers are producing less than one pound of butterfat a day, they will get along nicely on pasture alone.

As the season advances, the make-up of the common pasture grasses changes, and so you will need to change your grain mixture to meet the change in grass. **A good mixture for the late summer months is this:**

<table>
<thead>
<tr>
<th>Pounds</th>
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</thead>
<tbody>
<tr>
<td>Ground corn or ground barley</td>
</tr>
<tr>
<td>Ground oats</td>
</tr>
<tr>
<td>Linseed meal</td>
</tr>
<tr>
<td>Soybean meal</td>
</tr>
<tr>
<td>Salt</td>
</tr>
</tbody>
</table>

If you feed legume hay and silage besides a grain mixture, you may use the same mixture that you use in the winter. Give your heifers enough feed while they are on pasture to keep them from getting thin and to keep their milk flow from falling off.

**Plan a pasture program.** Since good pasture is such an important feed for dairy cows and since production costs are lowest when cows are on good pasture, you and your father should think your pasture program over very carefully.

You can greatly improve your permanent pasture by liming
and disking, and seeding sweet clover and other legumes. A few acres of rye seeded in late summer or early fall will give you good pasture for 10 days or 2 weeks in early spring. As soon as your cows eat the rye down, you can plow it under. A week or 10 days after you have worked the ground down well, you can seed it to Sudan grass. Plowing the rye under before it ripens and holding up the sowing of Sudan grass for a week or 10 days will help you to avoid any damage from chinch bugs. In a normal season your Sudan grass will be ready to pasture 5 or 6 weeks after you seed it and will give you a pasture of high quality during the hot summer months.

Feed all your dairy stock well, both your young stuff and your mature animals. Your young stuff cannot grow and develop as it should without the right feeds and enough of them. As a producer, you will have to feed well if you are to reach your goal, which is to produce large quantities of milk and butterfat at low cost.

**CARING FOR A CALF AND A HEIFER**

**Caring for a Calf**

As soon as the calf is dropped, paint the navel cord with iodine to prevent infection. If the mother does not lick the calf dry, rub it dry with a cloth or clean, dry straw.

Much of the care a small calf needs has to do with its feeding. For instructions concerning feeding, see pages 18 and 19. Let the calf exercise in the sun. A calf needs both exercise and sunlight if it is to be strong-bodied.

**Give your calf good quarters.** After you take the calf away from its mother, put it in a clean, dry, well-lighted place. The quarters do not need to be fancy, but they ought to be roomy, clean, light, dry, and well ventilated. Use a box stall if you can. A box stall gives the calf more freedom than a stanchion or a narrow stall, and your calf will do better, keep cleaner, and be more contented in it than in smaller quarters.
Clean and disinfect the stall thoroughly before you put the calf in it. Caution now may prevent trouble later on. Clean the stall every day and put in fresh, dry bedding. A wet, dirty stall is unhealthful and uncomfortable. You may darken the stall during the summer months when the weather is hot and the flies are bad.

You may protect your calf against the flies still more by covering it with a light burlap blanket.

Make your calf a pet. Your calf will do better if you make a pet of it. Handle it often and be kind to it and it will be your friend. Successful dairymen are kind to their cattle. Besides, making a pet of your calf will be an advantage to you at show time. You will not want to show a wild, unruly, and poorly trained calf.

Give your calf good care. Your calf is like a baby; it needs sanitary care and surroundings and proper feeding. To insure your calf's health, follow these sanitary precautions:

1. Provide a clean, sanitary place for the calf to be born in.
2. Before the calf nurses, wash the dam's udder and teats thoroughly with a chlorine solution.
3. Prevent infection by applying tincture of iodine to the calf's navel cord as soon after the calf is born as you can.
4. Keep the calf in a clean, dry, well-bedded stall.
5. Feed the calf from a clean pail.
6. Do not let one calf suck another.

To be sure that your calf is properly fed, follow the instructions for feeding given on pages 18 and 19.

Caring for a Heifer

You will have had some interesting experiences before you reach the heifer project if you began club work with a calf and have gone thru a year of club work with it. Besides the experience of raising the calf, you will have learned some things at the county show and will be looking forward to your second year’s work with a yearling heifer.

Don't breed your heifer too young. Let the breed and growth of your heifer guide you when you decide at what age she should drop her first calf. Breeding her too early may make her undersized since producing milk tends to hold back a heifer's growth.
You may safely breed a well-grown, thrifty heifer, however, earlier than one less well grown.

Jerseys mature earlier than other breeds and may usually be bred when they are 15 to 17 months old. A heifer bred at 15 to 17 months will drop her first calf when she is 24 to 26 months old.

Holsteins and Brown Swiss need more time to develop properly. They should not calve before they are 28 to 30 months old. Guernseys and Ayrshires should not be bred as young as Jerseys, but they may be bred sooner than Holsteins and Brown Swiss.

Breed your heifer to a good bull. If you are to lay the foundation for a high-producing, valuable dairy herd, choosing the bull to which you breed your heifer is most important. Breed her to the best bull that you can get her to. If necessary, take her several miles for breeding.

The bull you choose should be a proved one. A proved bull is one that is already the sire of daughters who have production records higher than their dams, who in their turn were high-producing cows.

Three cooperative breeding associations in Illinois supply semen for artificial breeding. You can probably have one of them supply you with semen. The bulls these cooperative associations use are selected with great care by a committee of experienced breeders.

From the start, outline and follow a breeding program which will improve the type and the production of the animals that your cows calve.

Good feeding highly important. With a bred heifer good management is mainly a matter of good feeding. For the proper feeding program, see pages 21 and 22.

Be very careful not to get your heifer too fat before calving time. If you feed her heavily until she drops her calf, she is likely to have a badly caked udder and a weakened udder attachment.

Special care needed at calving time. During the summer, a pasture which has plenty of shade is a good place for your heifer to calve. Take her away from other cows at calving time. If you have no other pasture or if she is to freshen at some other season of the year, give her a clean, disinfected box stall, bedded down with plenty of clean straw. Put her in the stall a few days
before she is due to freshen so that she will become familiar with her new surroundings. Do not disturb her at the time she calves, but see to it that someone is nearby who can help her if she needs help.

As soon as the calf is born, give the heifer a bucket of lukewarm water to which you have added a handful of salt.

The physical energy of your heifer is likely to be lowered after she calves. If the weather is cold, protect her from cold drafts and blanket her. For a day or two she will need only legume hay of good quality and a little bran mash.

As soon as the fever leaves her udder, you may safely start to feed her small amounts of the regular grain mixture. Slowly increase her daily feeding until she gets food enough to meet her needs for full production. Bringing her to full production may take two or three weeks or even longer.

**MANAGING A HERD**

Your herd will include one or more cows in production. It will probably also include calves, heifers, yearlings, and perhaps a bull. When, in the dairy project, your herd consists of animals of these ages, you will be a dairyman in fact. As a dairyman, your future will depend on: (1) your plans for increasing the productiveness of your herd; (2) your system of keeping records; (3) your culling of low-producing animals; (4) your use of outstanding sires; (5) your adherence to a strict sanitary program; and (6) your keeping the herd free from disease.

To manage your herd well you will need to have mastered the knowledge and the skills discussed on the previous pages of this manual. You will also need to know how to set up and stick to a strict program of sanitation and understand how to keep your herd free from disease.

**A Strict Program of Sanitation**

A strict program of sanitation is important for three reasons. First, it assures you that the milk you produce will be of high quality. Milk of high quality is more profitable than milk of poor quality. Since as a dairyman your main purpose is to produce milk and butterfat at a profit, a good sanitation program
Clipping around udder and hindquarters makes it easier to keep cows clean.

Daily liming of the barn floor helps to keep down barn odors and prevents many bacteria from developing. The hand spreader insures a good job and saves labor.

Scrubbing the floor and gutter occasionally with hot lye water helps to destroy bacteria.
may mean extra dollars. Second, milk is human food. As a dairy-man, your duty to your community requires you to furnish it a clean, pure food. Third, a good program of sanitation helps to maintain healthy udders and to prevent the spread of disease.

A good program of sanitation demands that you keep the stalls, barn, and cows clean and that you milk in a certain way.

**Keeping stalls, barn, and cows clean.** Disease germs live in filth. Clean premises and clean animals help to keep milk clean and to prevent disease. To keep the premises and the animals clean, you will have to do these things:

1. Remove soiled bedding and sweep the gutters and floor every day.
2. Lime the gutters and floor behind the gutters.
3. Use plenty of dry bedding.
4. Disinfect the floors, walls, stanchions, and mangers.
5. Keep lots next to the barn dry and clean.
6. Keep the cows clean and well groomed.

**Milking the right way.** Correct milking calls for the right equipment. Make sure that you have all the things listed below. Some dairymen find that putting these items on a cart that can be pulled along the milking line saves time and labor.

1. A pail of chlorine water (250 parts chlorine to one million parts water) at 130° F. Directions for getting this dilution are given on the chlorine container.
2. A cloth for each cow
3. A pail for used cloths
4. A pail of lukewarm water
5. A pail of warm chlorine water
6. A strip cup

Use this system. To milk correctly, you must follow the steps given below every time you milk. You must follow them exactly and must not skip any.

1. Wash and gently massage the cow’s udder and teats with a cloth dipped in very warm chlorine water (130° F.).
2. Place the cloth in the used-cloth pail.
3. Take one or two full-hand squeezes into the strip cup (never milk on the floor). Using the strip cup helps to produce
clean milk, spots cows giving abnormal milk, and stimulates the cow to let down her milk.

4. Apply milking unit immediately. (If you milk by hand, follow Steps 1, 2, and 3. Dry hands before milking, complete milking with full-hand squeezes, and wash hands before milking next cow.)

5. Allow milker to remain on cow about 3 minutes. Just before removing the milker, pull down gently on teat cups with one hand while massaging the udder downward with the other.

6. Dip the teat cups in lukewarm water, then into the pail of warm chlorine water, and apply milker to the next cow which has already been prepared for milking as described above.

7. Check the cow just milked for completed milking, using full-hand squeezes.

8. Dip each teat into chlorine water (250 parts of chlorine per million parts of water). Use fresh chlorine water for each cow.

Use right kind of utensils and keep them clean. These two precautions are very important if you are to produce clean, pure milk. (1) Use a seamless bucket and strainer. (2) Wash each thoroughly after you use it and rinse it in water containing a chlorine sterilizer. Inverting utensils on a rack to air is an old dairy practice and a good one. Rinse your utensils out with clean, pure water before you use them next.

**Testing for, Preventing, and Controlling Disease**

Make sure animals added to herd have been tested. Before you let any new animals come in contact with a healthy home herd, be very sure that they have been tested for tuberculosis, brucellosis (Bang’s disease), and mastitis. Most contagious diseases get into healthy herds when infected animals are added to it.

Many successful dairymen quarantine animals to be added to their herds until they are sure that the new animals do not have a contagious disease. If for any reason they suspect that an animal in the herd may have developed one of these diseases, they isolate it immediately and disinfect the premises.
Watch for signs of disease. Successful dairymen are constantly on the alert for any sign of disease in their herds. Three of the most costly diseases of dairy cattle are tuberculosis, brucellosis, and mastitis. If you have had your animals tested for tuberculosis and brucellosis at the time you bought them (see pages 6 and 7) and have had the calves born into your herd tested, you have taken a most important first step toward maintaining a healthy herd. To keep your herd healthy, have your animals tested for tuberculosis and brucellosis at regular intervals.

Plans for controlling brucellosis are offered by the Illinois Department of Agriculture in cooperation with the Federal Bureau of Animal Industry. If you need to use one of these plans, have your local veterinarian help you choose the best one for you (what is best for your herd will depend on many things). But no matter which plan you adopt, you will need to use sanitary management and blood testing at intervals.

Blood testing does not show the difference between reaction to vaccination and to natural disease. If some of your vaccinated calves are later blood tested and continue to show a positive reaction to the blood test, assume they have the disease.

Vaccination is not usually recommended for clean herds. Altho vaccinating calves helps to control brucellosis, it will not take the place of good management and herd testing.

Mastitis, or garget, is one of the most serious diseases of dairy cattle. It is believed to be caused by bacteria which enter the udder thru the teat canal. The symptoms are clotted and watery milk, a “caked” bag, heat, pain, and swelling in the udder. To prevent your cows from getting mastitis, keep your barn, stalls, and gutter clean; use plenty of bedding; and milk your cows in the way described on pages 31 and 32.

Treat common diseases promptly. Many of the common and minor diseases of dairy cattle you will be able to prevent if you stick to the sanitary measures outlined on pages 28 to 32. If one of the common diseases does appear, treat it promptly.

Scours. One of the most common diseases of calves is the scours. There are several causes of this disease: overfeeding; feeding from dirty pails; feeding milk at varying temperatures; feeding milk too
rich in butterfat; feeding sour or dirty milk; feeding milk with sepa-
ratior foam on it; feeding too much leafy legume hay; allowing the
calf to drink too fast; and keeping the calf in cold, damp, drafy
quarters.

When a calf gets the scours, put it in a stall away from other
animals and cut its rations in half. Give it about a half teacup of
mineral oil to which you have added $\frac{1}{2}$ to 1 tablespoonful of a mix-
ture made of two parts bismuth-subnitrate and one part salol. In bad
cases of scours, repeat the dosage in 6 to 12 hours.

As soon as the calf’s condition returns to normal, bring it back to
full feed. Find and remove the cause of the disease. Enriching the
ration with vitamins may help to prevent some cases of scours.

**Ringworm.** Ringworm is caused by a fungus. It usually appears
about the animal’s head and neck as small, yellow, crusty areas, which
vary from $\frac{1}{4}$- to 1-inch or more in diameter.

Wash these crusts with soap and water to remove them. Then apply
sulfur ointment or tincture of iodine every other day for several days.
Radiator alcohol or vinegar is also effective.

To prevent the disease from spreading, keep the infected animals
separated from the others and thoroly disinfect the stalls and halters
and anything that may spread the disease from one animal to another.
Human beings can get ringworm from animals. To protect yourself,
wear rubber gloves when you handle infected animals or materials.

**Warts.** Warts are horny-like growths that appear on the surface
of the skin. They can sometimes be rubbed off with sweet oil or castor
oil. Sometimes a 10 percent salicylic acid solution applied weekly will
remove them. Wart vaccines, given by veterinarians, are also helpful.
In severe cases, warts may have to be cut off.

**Lice.** Lice annoy a calf, lower its ability to resist disease, and
slow its growth. They are most common in winter.

You can usually control lice by dusting a louse powder along the
calf’s back and rubbing it into the hair with a brush; or you can rub
the powder in by stroking the hair in the direction opposite to that in
which it lies. To kill lice hatched after the first dusting, repeat the
treatment in about a week. During mild, comfortable weather, you
may get rid of lice by washing the calf in a solution of one part
lysol to fifty parts water. Dry the calf thoroly afterwards.

**Extra teats.** Rudimentary, or extra, teats detract from the ap-
ppearance of a cow’s udder. Remove them when the heifer is young. Tie
a piece of thread or wrap a rubber band tightly around the base of
the extra teat. In a few days it will fall off. A veterinarian often
cuts extra teats from milking cows.
GOING TO THE SHOW

The opportunity to show your calf at the 4-H Club show or fair is one of the great advantages of dairy club work. Going to a show gives you a chance to compare your calf with the calves of other club members or exhibitors. There you can check the condition, training, and growth of your calf against that of others in the show. You can see the strong and weak points of your own calf. From your experience at the fair you can learn more about desirable dairy type.

Prepare for the Show

Make your entry properly. If you are going to exhibit at a 4-H show or a fair, don’t fail to fill out your entry form if one is required and it usually is. You can get a form for a 4-H show from your farm adviser and one for a fair from the secretary of the fair.

Start preparations eight weeks before the show. Your calf should look its best at the show. To be ready for showing, it must be in condition, properly fitted, and carefully trained. It will take you eight weeks to get your calf ready.

Keep your calf indoors in a comfortable stall during the heat of the day; if possible, darken the barn to help keep out the flies.

Begin early to teach your calf to lead readily. Teach it to stand squarely on its feet with its head up so that it will show to best advantage in the ring. To teach your calf to show properly, you will have to handle it often and use a great deal of patience. It is a good plan to spend a few minutes every day in training your calf. A showman and his animal should understand each other thoroly.

Give special attention to feeding. Getting just the right amount of flesh on a young animal to make it show well is not hard if you have given it the right care. While you don’t want your calf to be too fat, you do want it to carry flesh enough to have a good, thrifty, sleek look. Changing the ration a month before the show will help put the calf in condition to show well and will improve the appearance of the hide. A good grain ration to use is: 5 parts wheat bran, 3 parts ground oats, 1 part ground corn, and 1 part linseed meal.
How much you feed will depend on the condition of the calf. Use plenty of clover hay or mixed hay. If your calf shows any tendency to “looseness” on this ration, reduce immediately the amount of feed it gets.

**Attend to hoofs and horns.** Neat, shapely horns add to the appearance of your calf. If your calf’s horns have a tendency to be out of shape, you can use horn trainers (if you use them properly) to help bring them into correct position.

To polish a calf’s horns, first scrape them with a piece of broken glass or a steel scraper; then use some common sandpaper to make them smooth. Next rub them with fine emery paper. Last, polish them with strips of cotton flannel, pumice stone, and a little sweet oil. Rub the horn seesaw fashion with the cloth and pumice stone for three or four minutes; put some oil on the horn and with a second piece of flannel seesaw as before; then with a dry cloth, go on rubbing until you get the right polish.

Sometimes the horns of older heifers are long and coarse. It is then advisable to shorten them slightly and reduce them to a desirable size and shape. To shorten and size them, use a rasp with a rounded side.

Your calf should stand with natural ease. If its hoofs have

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Before the show sandpaper your calf’s horns, and clip it around its head and ears to give the head a refined, clean-cut look.
grown in such a way that it cannot so stand, trim them. Polish and clean them before you lead your calf into the ring.

**Improve the quality of your calf’s hide.** About a month before the time for you to show your calf, blanket it heavily until its skin becomes soft and pliable; then use lighter blankets. Take the blankets off every day and thoroly groom the calf. Use soft brushes, soft cloths, a little sweet oil, and plenty of hand rubbing. Two or three weeks before the show give the calf a good washing and continue grooming and rubbing.

**Clip if necessary.** If you have groomed your calf properly, you will not need to clip it very much. (A calf will rarely need to be clipped completely.) Your calf will show to best advantage if its tail, belly, face or head, and neck have been clipped. To clip the tail, begin a few inches above the place where the long hairs of the switch start; don’t clip too high on the tail.

A lot of brushing is needed to get your calf ready for the show. Brushing takes the dirt from the hair and hide and stimulates circulation. Good circulation improves the quality of the hide and makes it pliable.
Observe the health regulations. The Illinois state law demands that before animals can be exhibited at fairs and other shows, they must meet certain health requirements, particularly requirements concerning tuberculosis and Bang’s disease. Find out well ahead of fair time what the health regulations are and comply with them.

Take the equipment you will need. Some time before you take your calf to the show, make a list of the equipment you will need there. Your list will include: a water bucket, feed bucket, blanket, hand clippers, flashlight, show halter, soap, comb and brush, bottle of sweet oil, sandpaper, emery paper, flannel cloths, and a pitchfork.

At the Show

After the calf is unloaded at the fairground, see that it is well bedded in a comfortable stall. Keep the stall clean and neat at all times. Visitors appreciate cleanliness. Furthermore, nothing detracts more from an exhibit than dirty, poorly kept quarters.

Feed the same feeds at the show that the calf was used to getting at home. Taking enough grain with you to last throughout the show is a good plan; it lessens expense and you don’t have to change the ration.

At the show never water your calf from a common water tank or trough. Water it from your own bucket and let no one else use the bucket. Don’t let your hay be scattered around where visitors or other exhibitors will walk on it. Simple precautions such as these will help you avoid trouble from infectious diseases.

The day before the show there will be plenty of work to do. See that your calf is especially well bedded; and to keep it from getting dirty, see that all soiled bedding is promptly removed. You will probably need to give the calf’s horns some attention, tho you should not put on the final polish until the morning of the show. Wash the switch on the calf’s tail thoroly and braid it into two or three tight braids of even size. Work a string into each braid so that the braid can be tied. Don’t comb the tail out until just before the judging.

Feed your calf a little salt the night before the show and don’t give it all the water it wants. You want to show your calf
with the proper fill. Feeding a little salt and withholding some water will stimulate the calf's appetite for water the next morning and assure getting the proper fill.

**Show day.** Find out the exact time the calves are to be shown. Then give yourself plenty of time to "dress up" your calf. Clean it thoroughly, comb out the switch, put the final polish on the horns and hoofs and see that the show halter and other equipment you need are ready. Do not forget that as a showman you should also be neat and clean.

Water your calf just before you lead it into the ring. Be careful not to let it drink too much; it will probably have a big appetite for water, but too much will make it look bloated and keep it from showing to good advantage.

**In the ring.** When the time comes to show, be ready to lead in promptly. Keep your calf looking its best all the time. If you have trained it properly before the show, you won't have to work with it all the time you are showing it. Never allow it to slump; slumping may affect its placing.
After the awards have been made, inspect the other calves. Try to see what makes one better or less good than another. Comparing calves in this way is more important than prize money, for the most valuable thing the show can do for you is give you a chance to learn more about dairy animals. Since the calves will be shown another year, what you learn at the show one year will improve your chances of placing higher the next time. Of course if you were at the top this year, you will probably need all the help you can get to enable you to make top place again next year.

Take every chance to join in judging contests. There is no better way to get experience in evaluating dairy animals. These 4-H boys are judging Guernsey cows in front of the dairy barns at the University of Illinois.