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DAIRY III---THE 4-H DAIRY COW CLUB

4-H CLUB CIRCULAR 28

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**COOPERATIVE EXTENSION WORK IN
AGRICULTURE AND HOME ECONOMICS**
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Dairy III--The 4-H Dairy Cow Club

REQUIREMENTS OF DAIRY III--THE 4-H COW CLUB PROJECT*

Object.—The object of the dairy club work is to organize boys and girls into club groups for the purpose of demonstrating approved methods of dairy cattle feeding and management, of record keeping, something as to the meaning of pedigrees and their values, dairy cattle judging, fitting and exhibiting, buying and selling prices; and to train the members in leadership.

Work Required.—Each club member is required to feed and care for a producing dairy cow for a period of one year, preferably beginning about the freshening time.

Records Required.—Each club member is required to keep an accurate account of feeds, rations, calving, breeding, milk and butterfat production, value of same, and profit or loss, (milk and butterfat production will be determined by weighing the milk daily and by making monthly tests) and to write a story of the year's work, in a record book provided by the Extension Service of the Missouri College of Agriculture.

Ownership Required.—Each club member is required to own a producing dairy cow and to furnish all the feed necessary for the project, and to own jointly with other members of the club a small, enclosed Babcock tester with the necessary supplies, unless such an outfit is available in the community.

Expense.—Estimated cost of tester—\$18.00 to \$20.00.

Time Required.—Time to care for the dairy cow.

Time for attendance at six or more club meetings.

Time for one all-day club tour.

Time for one all-day round-up or achievement program at the close of the year's work.

Organization.—Old clubs will start at the close of Dairy II work. New clubs may start Dairy III work at any time, with preference for freshening cows in the fall.

I. ORGANIZATION OF A STANDARD 4-H DAIRY CLUB

A standard dairy club is composed of a group of five or more boys or girls from the same community between the ages of ten and twenty-

*Prepared by M. J. Regan and A. F. Stephens, Dairy Extension Specialists, in collaboration with T. T. Martin, State Club Agent.

one years who are working upon the same dairy club project under the direction of a local club leader.

Securing Dairy Animals.—The following suggestions are made regarding securing dairy animals:

1. Dairy clubs should be organized only in communities which are suited to dairying.
2. The dairy breed which is best adapted to the community should be selected.
3. A substantial man who has the confidence of the community should be secured to assist in buying the animals, if Dairy III is started as a new club.
4. Wherever it is possible to buy satisfactory cows locally, it is best to do so, letting the club members make their own selection. If this practice is impossible, the cows should be bought and shipped in together and the members should draw lots for their animals.
5. The question of finances should be solved by each individual member at home or with the banker.
6. Inferior animals should not be secured for club members. Only good purebreds should be secured. If they cost too much money, real good grade animals should be secured instead. It is always better to have a real successful club with good grades than to encumber the members too heavily in debt with purebreds in a community which does not yet appreciate the value of good dairy stock.

Meetings.—Standard 4-H clubs are required to hold at least six regular meetings during the club year. These meetings may be held as often as the local club leader and members desire; however, the meetings usually are held once each month.

Below are subjects suggested for a number of club meetings. It may be necessary to devote two or more meetings to some of the subjects. It is suggested that these subjects be followed in the order named. *Local club leaders and clubs are expected to adapt these subjects to local community conditions.*

SUGGESTED MEETING FOR THE 4-H DAIRY COW CLUB

I. Organization of the Club (See Club Secretary's Record Book)

1. The business meeting.—The local club leader in charge.
 - (1). Explanation of the duties of the club officers and members. (See the Club Secretary's Record Book.)
 - (2). Election of club officers from the membership of the club: President, Vice-President, Secretary, Song and Yell Leader, and the Club Reporter.
 - (3). Selection of a name for the club. (It is suggested that the name be selected so as to identify the club and the project.)

- (4). Selection of a time and place for regular club meetings.
 - (5). Appointment of a committee to work up or select an appropriate song and yell for the club.
 - (6). Adjournment of the business meeting for instruction in club project work.
2. Instructions.—The local club leader in charge.
- (1). Distribution of club literature and the record books and explanation of their use.
 - (2). Explanation of the standard 4-H club requirements. (See Club Secretary's Record Book.)
 - (3). Explanation of the club project requirements. Page 3.
 - (4). Setting one or more club goals, such as:
 - a. Every member will feed and manage a dairy cow as recommended by the Missouri College of Agriculture.
 - b. Every member will take part in the dairy club tour.
 - c. Every member will learn to judge, to demonstrate and to exhibit.
 - d. Every member will fit and show his animal at the round-up or fair.
 - e. Organization of a 4-H Breeders' Herd Dairy Club in the community at the close of the 4-H Dairy Cow Club work.
 - (5). Giving a brief statement of the main club events for the year as:
 - a. Holding six or more regular club meetings.
 - b. Giving club team demonstrations before a public audience.
 - c. Planning to take part in local fairs.
 - d. Planning to attend and take part in the State 4-H Club Round-Up at the Missouri College of Agriculture.
 - e. Other activities as worked out in the community.
 - (6). Securing Dairy Animals—Page 4
 - (7). Assignment of work for the next meeting:
 - a. Assignment of the National 4-H club pledge to be learned by all members before the next club meeting. (See the pledge in the suggested outline for the second club meeting.)
 - b. Assignment of topics to be used in response to roll call at the next club meeting, as:
 - (a). Name a standard 4-H club requirement and give one or more good reasons for the requirement.
 - (b). State kind of records that should be kept on a dairy herd.
 - (c). State briefly the correct method of taking a composite sample of milk for testing.
 - (d). State in order the main points in the process of testing.
 - c. Reference.—
 - (a). Kinds of Records to Keep; Testing Milk for Butterfat. Page 10.
 - (b). Demonstrations:
 - Sampling Milk.
 - Testing milk for butterfat.
 - System of keeping records.
3. The social hour, games, etc.

II. Second Club Meeting.—Kinds of Records to Keep; Testing Milk for Butterfat

1. The business meeting.—The club president in charge.
Duties of Club Officers.—(See Club Secretary's Record Book.)
 - (1). Meeting called to order by the president, who leads the club members in repeating the National 4-H club pledge, as follows: "I pledge my *head* to clearer thinking, my *heart* to greater loyalty, my *hands* to larger service, and my *health* to better living, for my club, my community, and my country."
 - (2). Roll call by the secretary, the members responding by reporting on the previously assigned topics.
 - (3). Reading of the minutes of the last meeting by the secretary which should be adopted as a permanent record by the club when approved.
 - (4). Unfinished business:
 - a. Report of the committee on club songs and yells.
 - (5). New business:
 - a. Appointment of a social committee.
 - (6). Songs and yells, led by the song and yell leader.
 - (7). Adjournment for work.
2. Instruction and demonstrations.—
 - (1) Discussion: Kinds of Records to Keep; Testing Milk for Butterfat. Page 10.
 - (2). Demonstrations:
 - a. Sampling milk.
 - b. Testing milk for butterfat.
 - c. System of keeping records.
 - (3). Assignment of work for the next club meeting:
 - a. Assignment of topics to be used in response to roll call at the next club meeting, as:
 - (a). Name a standard 4-H club requirement not previously given in response to roll call and give one or more good reasons for the requirement.
 - (b). Name the four constituents which are contained in feeds for milk production.
 - (c). Designate the parts of the cow's body which each of these constituents build up.
 - (d). State reasons for giving the cow plenty of water, and name kind of water to avoid.
 - (e). State briefly the necessity of the different constituents of feed for milk production.
 - b. Reference:
 - (a). Feed Constituents.—Page 12.
 - (b). Feeding Dairy Cows.—University of Missouri.
 - (c). Feeds and Feeding.—Henry and Morrison.
 - (d). Demonstration: Show how to figure the amount of each constituent needed in a ration for a 1,000 pound animal.
3. Social hour, games, etc.

III. Third Club Meeting.—Feed Constituents

1. The business meeting.—The club president in charge.
 - (1). Meeting called to order by the president, who leads the club members in repeating the National 4-H club pledge.

- (2). Roll call by the secretary, the members responding by reporting on the previously assigned topics.
 - (3). Reading of the minutes of the last meeting by the secretary which should be adopted as a permanent record by the club when approved.
 - (4). Unfinished business:
 - a. Report of the committee on club songs and yells.
 - (5). New business:
 - a. Appointment of a social committee.
 - (6). Songs and yells, led by the song and yell leader.
 - (7). Adjournment for work.
2. Instruction and demonstration.—The local club leader in charge.
- (1). Discussion: Feed Constituents. Page 12.
 - a. The water supply.
 - b. Mineral feeds for cows.
 - c. Protein feeds.
 - d. Energy feeds.
 - (2). Demonstration: Show how to figure the amount of each constituent needed in a ration for a 1,000 pound animal.
 - (3). Assignment of work for the next club meeting:
 - a. Assignment of topics to be used in response to roll call at the next club meeting, as:
 - (a). Name a standard 4-H club requirement not previously given in response to roll call and give one or more good reasons for the requirement.
 - (b). Name the main points in the score card for judging dairy cattle and state the percentage of importance for each point.
 - (c). Give the important points to be observed in fitting and showing an animal.
 - (d). Name the important points in the score card for judging team demonstrations and state the percentage of importance for each point.
 - b. References:
 - (a). The Dairy Club Tour. Page 15.
Schedule of tour.
Judging and Selecting the Dairy Cow.—A. C. Ragsdale, Chairman Dairy Department, University of Missouri.
 - (b). Score card for judging dairy cattle. Page 16. Individual breed score cards, illustrated judging sheets, judging manuals and judging instructions, may be secured from the breed associations.
 - (c). Methods of Judging Dairy Cattle. Page 17.
3. The social hour, games, etc.
- IV. Fourth Club Meeting.—The Dairy Club Tour**
1. The business meeting.—The club president in charge.
 - (1). Meeting called to order by the president who leads the club in repeating the National 4-H club pledge.
 - (2). Roll call by the secretary, the members responding by reporting on the previously assigned topics.
 - (3). Reading of the minutes of the last meeting by the secretary.
 - (4). Unfinished business:

- a. Report of the social committee.
- (5). New business:
 - a. Anything for the benefit of the club.
- (6). Songs and yells.
- (7). Adjournment for work.
- 2. Instruction and demonstrations.—The local club leader in charge.
 - (1). Discussion: Observations made on the club tour.
 - (2). Demonstrations:
 - a. Judging dairy animals by use of the score card.
 - b. How to exhibit a dairy animal.
 - c. Fitting an animal for the show.
 - (3). Assignment of work for the next club meeting:
 - a. Assignment of topics to be used in response to roll call at the next club meeting, as:
 - (a). Name a standard 4-H club requirement not previously given in response to roll call and give one or more good reasons for the requirement.
 - (b). Name at least six important factors in mixing a dairy ration.
 - (c). State the first thing to consider in building a dairy ration.
 - (d). Give briefly the proper grain rations for the different classes of roughage.
 - (e). State briefly how to feed cows on pasture.
 - (f). State briefly how to feed the proper feeds for winter production.
 - (g). State briefly how to feed dry cows.
 - b. References:
 - (a). Requirements of a Dairy Ration. Page 22.
 - (b). Demonstration: Mixing a dairy ration.
- 3. Social hour, games, etc.

V. Fifth Club Meeting.—Requirements of a Dairy Ration

- 1. The business meeting.—The club president in charge.
 - (1). Meeting called to order, the members repeating the 4-H club pledge.
 - (2). Roll call, members responding by reporting on the previously assigned topics.
 - (3). Unfinished business:
 - a. Report of any standing committee.
 - (4). New business:
 - a.
 - (5). Songs and yells.
 - (6). Adjournment for work.
- 2. Instruction and demonstration.—The local club leader in charge.
 - (1). Discussion: Requirements of a Dairy Ration. Page 22.
 - a. Selecting rations for milk cows.
 - b. Feeding recommendations.
 - c. Feeding dry cows.
 - (2). Demonstration: Mixing a dairy ration.
 - (3). Assignment of work for the next club meeting.
 - a. Assignment of topics to be used in response to roll call at the next club meeting, as:

- (a). Name all the standard 4-H club requirements in response to roll call.
- (b).
- b. References:
 - (a). Individual try-outs for the club demonstration team. Page 30.
 - (b). Individual try-outs for the club judging team. Page 30.
- 3. The social hour, games, etc.
- VI. Sixth Club Meeting.—Individual Try-Outs for the Club Demonstration and Judging Teams**
- 1. The business meeting.—The club president in charge.
 - (1). Meeting called to order by the president, who leads the club members in repeating the 4-H club pledge.
 - (2). Roll call by the secretary, the members responding by reporting on the previously assigned topics.
 - (3). Reading of the minutes of the last meeting by the secretary.
 - (4). Unfinished business:
 - a.
 - b.
 - (5). New business:
 - a.
 - b.
 - (6). Songs and yells.
 - (7). Adjournment for work.
- 2. Instruction and demonstrations.—The local club leader in charge.
 - (1). Individual try-outs for the club demonstration team. Page 30.
 - (2). Individual try-outs for the club judging team. Page 30.
 - (3). Assignment of work for the club round-up:
 - a. Giving detailed instruction regarding the responsibility of each club member, of the club teams, of club committees, and of the club as a group, on the club round-up program. Page 30.
- 3. Social hour, games, etc.

VII. Seventh Club Meeting.—The 4-H Dairy Cow Club Round-up

The club round-up should be held at the close of the work for the club year. Each member should hand in to the local club leader the completed record book so that the results of all the work of the club can be summarized in the back of the club secretary's record book.

SUGGESTED PUBLIC PROGRAM
The local club leader in charge.

- 1. Exhibit of the dairy club cows by the members. An explanation of the placings should be given by the judge if time permits.
- 2. A regular meeting of the club. Each member should respond to roll call by giving a summary of his dairy club work.
- 3. A short talk on the work of the dairy club for the year. This information may be given by the local club leader, by a member of the local dairy club committee, or by the extension agent.
- 4. Team demonstration. The champion club demonstration team should demonstrate an approved dairy practice which has been learned in the dairy cow club work.
- 5. Judging demonstration. The team may demonstrate dairy conformation and type.

6. Awards. Each member who completes the work is eligible to receive a 4-H club achievement pin, if given.
7. Plans for conducting dairy club work for the next year.

SUGGESTIONS

Only club members who make a complete report or have their records up-to-date should be eligible to take part in county, district, state, inter-state or national contests, club camps, or take club achievement trips.

II. KINDS OF RECORDS TO KEEP; TESTING MILK FOR BUTTERFAT

Breeding and Calving Records.—It is always advisable to keep records on the breeding of all cows as well as the dates of calving. If you have the breeding dates in hand, you will know just when to expect each cow to calve and will often be saved the loss of a calf, and will also be aided materially in the sale of calves. The records are an item which it is very little trouble to keep but which may mean quite a little to the dairyman. Breeding dates and calving dates are required before you can register any animal.

Feed and Other Cost Records.—One advantage in keeping feed and other cost records on your cow is that you will know at the end of the year just what your cow has cost you. Then by checking up with your production records, you will know just what your profit or loss is and whether or not it will pay you to keep her. Another advantage which feed records have is that you then have a way of knowing just what you have fed and what effect certain feeds have had upon the production of your animal. In this way, you will soon find what feeds are best to give your cow and the best way of handling her.

Milk and Butterfat Records.—The importance of keeping production records cannot be over emphasized. Very little time is required. All that is necessary is to hang a pair of scales in the barn just back of the cow's stanchion and tack a monthly milk sheet up on the wall. Then each time after you get through milking your cow, weigh the milk and record the weight. Some time during the month, take a sample of night's milk and a sample of morning's milk, mix the two and test it. This will give you a fair average test for the month. At the end of the month, take down your milk sheet, total it and apply your test to the total of milk to get the pounds of butterfat for that month. Then by taking the average price of butterfat produced for the month, you can determine the value of the fat produced by your cow during the month. Add the value of the skimmilk to the value of the fat to find what your cow was actually worth that month. Keep this up for a year and with your feed records you will know just what your cow is capable of doing and you will know what she is worth. Cows are coming more and more to be bought and sold on the basis of what they actually produce.

Another point in favor of keeping records is that you have something by which to gauge your feeding. Many cows could profitably be fed more, while others are being given more feed than they have any need for. If you are keeping records, you can feed accordingly and avoid this loss. Also, if a cow is going "off feed" or is sick from any other causes, she almost invariably shows it in her milk flow. If you are weighing the milk, you will notice this much more readily than otherwise and in that way can "head off" any trouble that may be coming on.

Sampling.—For ordinary testing work, it is usually customary to take a sample of night's and morning's milk; mix the two and test the composite. In taking a sample, stir the milk well with a dipper and fill a one-half pint bottle one-third full. Then for the next milking, repeat the operation, filling the sample bottle about another one-third full.

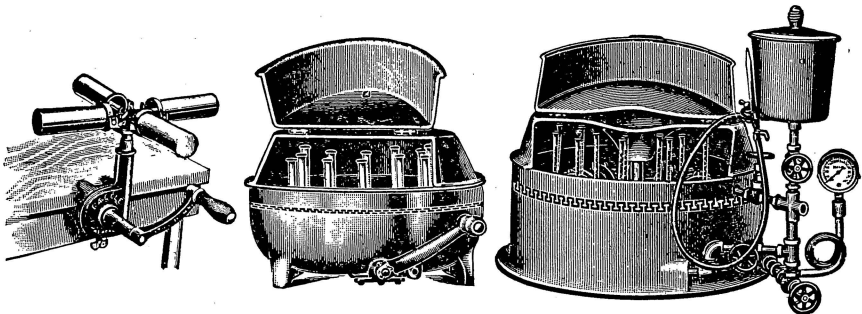


Fig. 2.—Various types of Babcock testers. Reading from left to right; the 4-bottle hand tester, the 12-bottle hand tester, and the 12-bottle steam tester.

Testing.—Warm (or cool) the milk and acid to about 60° F. (If you get it much warmer it will charr when the acid is added.) Mix the milk well by pouring from one bottle to the other. Then by suction, draw 17.6 cc. (cubic centimeters) of milk into a pipette (up to the mark on the neck) and insert it into a milk test bottle. Measure out 17.6 cc. of sulphuric acid in a measure and pour it down the neck of the test bottle. Shake the bottle with a whirling motion until the whole solution takes on a coffee colored appearance. Put it in an ordinary milk tester and turn it at the rate of about 80 turns per minute for five minutes. This gives about 1,080 revolutions per minute inside the tester. Add water at 130° to 140° F. up to the neck of the bottle and turn for two minutes longer. Then add water up nearly to the top of the graduated part of the bottle and turn for one minute longer. Take the bottle out and set it in a hot water bath at 130° to 140° F., being careful that the water comes as high as the top of the fat column along the graduated

neck of the bottle. Always read from the top of the meniscus, at the top of the fat column.

The acid added to the milk breaks or burns up the fibrin in the milk and releases the fat globules. Then the whirling centrifugal motion brings the lighter fat globules to the top and the heavier parts sink to the bottom of the solution.

Always keep the utensils clean. Cleanliness is essential to accurate testing.

III. FEEDING CONSTITUENTS

In studying the ways to feed cows and the kinds of feeds to give them in order to make the most profit from them, we should remember first that feeds contain a number of different types of constituents. Among these are water, mineral matter, protein, and energy feeds or carbohydrates and fats.

The cow's body is also made up of these four constituents and she must have a certain amount of each to keep her alive. The water is found in the blood and throughout the entire body. The mineral is mostly lime and phosphorus and is found in the bones, hoofs, hair, skin and to some extent in the blood. Protein is found mostly in the muscles, bones, skin and hair, while the fats are found largely in the fatty portions of the body. Milk also contains a certain amount of each of these four constituents, though they are all in solution and we cannot separate them except by chemical analysis.

Now it happens that some feeds are very high in one of these constituents but are low in others. Some may contain a large amount of two kinds of constituents but no cow feeds contain just the right amount of all of them. For instance, corn contains a great deal of energy feed like carbohydrates and fats but contains very little mineral and protein. On the other hand, soybean hay contains a great deal of both protein and mineral matter. It is absolutely impossible for the cow to make any one of these take the place of another. If we feed too much of one and not enough of another then the surplus of one will go to waste because we didn't have our feeds balanced and besides we will not get as much production and profit from the cow as we should. Then what we want to learn is which feeds serve each purpose and how much of each to feed. In order to do this, we shall take up each of these constituents as we have named them.

The Water Supply.—It seems strange that it should be necessary to mention this since a liberal supply of pure fresh water is available with little or no effort or cost on the average farm. Yet it is a fact that the profits from cows are very materially reduced on a great many farms

simply because cows do not get enough pure water. Since 56 per cent of the cow's body is made up of water and 87 per cent of her milk is water, we should readily see that she needs to consume large quantities of it. An ordinary cow will drink about 12 gallons of water a day and a real high producing cow needs more.

A cow should have all the water she wants and should have it as often as she wants it. This water should be clean from a running stream or spring, or direct from a well. A stagnant pond is not only a source of filth but is likely to be dangerous as a disease spreader at any time.

This water should be at a reasonable temperature. No cow can drink enough ice water to maintain her body and produce a reasonable flow of milk. If the cows are being watered from a tank in the winter time, it will always be found economical to arrange a tank heater or other means of bringing the water up to at least the temperature at which it comes from the well before watering them.

Mineral Feeds for Cows.—As was mentioned in the last discussion, the cow needs feeds that contain mineral matter to keep up her bones, teeth, and masculine tissues as well as to make milk. Milk contains a great deal of mineral and especially lime. A quart of milk contains as much lime as 30 pounds of beef, or 23 pounds of potatoes, or 11 loaves of white bread. Milk contains a great deal more lime and mineral matter than any other common human food. We need this lime to make teeth, bones and muscles and most people who drink plenty of milk from infancy are strong and have good teeth for this reason.

But the cow must be provided with feeds that contain plenty of mineral matter if she is to have them from which to make milk. The most important mineral is lime.

THE AMOUNT OF LIME IN DIFFERENT FEEDS

| Kind of Feed | Pounds of Lime Per Ton of Feed |
|---------------------|-----------------------------------|
| Alfalfa hay..... | 39 Pounds |
| Soybean hay..... | 35 Pounds |
| Red clover hay..... | 32 Pounds |
| Corn stover..... | 13 Pounds |
| Wheat straw..... | 6 Pounds |
| Millet..... | 6 Pounds |
| Timothy..... | 5 Pounds |

From this table we see at a glance the importance of alfalfa, soybeans and clover as a source of mineral matter for the cow. The cows should

always have all of one of these kinds of hay that she will clean up once a day during the entire feeding season.

Salt is another mineral which should be mentioned. A cow should always have all of the salt that she wants. For a cow in milk, this will vary from one to two ounces a day. She may be given free access to it or it may be mixed in the grain ration at the rate of one pound of salt to every 100 pounds of grain mixture.

Protein Feeds.—Proteins are the kinds of feed that go mostly to build up muscles and lean meat. Quite a bit of protein is also found in the bones, hair, skin, and other parts of the body. Milk also contains very large quantities of protein which is another reason why it is such a good human food.

A cow must have a liberal supply of feeds that contain protein in order to be a good milk producer. It takes seven-tenths of a pound of protein a day just to keep a 1,000-pound cow alive. In addition to that, she needs about half-a-pound of protein for each gallon of milk she produces. So we should know just what feeds are highest in protein and should furnish her with enough of them. Some common feeds with the amounts of protein they contain are shown at the bottom of this page.

From this we see very readily that among roughage feeds, alfalfa, soybeans, and clover are our very best sources of protein. Also, our grain feeds, soybean oil meal, cottonseed meal and linseed oil meal are our best sources of protein.

AMOUNT OF PROTEIN IN DIFFERENT FEEDS

| Kind of Feed | Pounds of Protein in Each Hundred Pounds of Feed |
|-------------------------|--|
| Soybean hay | 11.7 Pounds |
| Alfalfa hay | 10.6 Pounds |
| Clover hay | 7.6 Pounds |
| Orchard grass | 4.7 Pounds |
| Timothy hay | 3.0 Pounds |
| Corn stover | 2.1 Pounds |
| Corn silage | 1.1 Pounds |
| Wheat straw | 0.7 Pounds |
| Soybean oil meal | 39.7 Pounds |
| Cottonseed meal | 37.0 Pounds |
| Linseed oil meal | 30.2 Pounds |
| Wheat bran | 12.5 Pounds |
| Ground oats | 9.7 Pounds |
| Ground corn | 7.1 Pounds |
| Corn and cob meal | 6.1 Pounds |

It is worth while to mention here that protein and mineral matter are the two kinds of feed of which we are short on nearly all Missouri farms. These are feeds that can be supplied very cheaply through home grown soybeans, clover or alfalfa, and if grown and fed will very greatly increase the profits from the average herd. Any club boy who does not have some one of these hay crops at home, will do well to raise a little of one of them along with his dairy club project.

Energy Feeds.—The last constituent to which we previously referred, was the carbohydrates and fats or energy feeds. These are usually referred to as energy feeds because they furnish energy and heat for the body. They include feeds which contain plenty of fat, starch and sugar. They are needed to maintain the fatty portions which are found to a greater or less extent throughout the body. Milk also contains a great deal of fat as well as plenty of milk sugar. These feeds are needed to furnish the fat and the milk sugar to go in milk.

IV. THE DAIRY CLUB TOUR

How the Tour is Conducted.—It is recommended that the county extension agent and the local club leaders conduct the dairy club tour in June or July. At that time of the year the project work will be far enough along to show results.

Usually, one all-day automobile tour is conducted for all the dairy clubs of a county. The dairy club members, their parents, local dairymen and other interested persons of the communities should be invited to take part in the tour.

The program generally consists of making a visit to one or more farms on which good dairy cattle are produced and to the home farms of as many of the club members as possible. The tour is made more interesting if each dairy club member shows his calf and tells the visitors about his project work when they arrive at his home farm to observe his animal. A regular club meeting should be held at noon following a picnic lunch. Special training should be given the club members in fitting, showing and judging dairy cattle while on the club tour, which should help to prepare them for taking part in the dairy club judging contests of the county and at the State 4-H Club Round-Up which will be held at the Missouri College of Agriculture early in August.

Judging.—The following score card should be used during the dairy club tour to assist in an intelligent inspection of the dairy calves.

SCORE CARD FOR JUDGING DEMONSTRATION TEAMS IN MISSOURI

SCORE CARD FOR DAIRY COWS

| Scale of Points | Per Cent | 1 | 2 | 3 | 4 |
|---|----------|---|---|---|---|
| INDICATING EFFICIENCY OF MILK SECRETING SYSTEM—FORTY POINTS: | | | | | |
| Udder—large, evenly quartered, well held up, not meaty, attachments long, teats squarely placed and of convenient size..... | 30 | | | | |
| Milk Veins—capacious, entering a few large wells or numerous small ones..... | 10 | | | | |
| | 40 | | | | |
| INDICATING CAPACITY—TWENTY-FIVE POINTS: | | | | | |
| Muzzle—wide..... | 1 | | | | |
| Jaw—wide in angle, strong..... | 1 | | | | |
| Barrel—deep, wide, long, well held up with ribs broad, long, far apart, slanting, well sprung..... | 23 | | | | |
| | 25 | | | | |
| INDICATING CONSTITUTIONAL STRENGTH AND VIGOR—FIFTEEN POINTS: | | | | | |
| Nostril—large, expanded..... | 1 | | | | |
| Eye—prominent, bright, intelligent..... | 1 | | | | |
| Chest—wide, deep..... | 4 | | | | |
| Skeleton—developed for strength, of good quality; roomy, long and level at pelvis..... | 5 | | | | |
| Skin—loose and mellow showing good circulation and secretion..... | 2 | | | | |
| Carriage—energetic, prompt, alert..... | 2 | | | | |
| | 15 | | | | |
| INDICATING DAIRY TEMPERAMENT—TEN POINTS: | | | | | |
| Body—wedge shape. General appearance—angular and lean, yet clean cut and neat in every part..... | 10 | | | | |
| BREED TYPE—TEN POINTS: | | | | | |
| Points characteristic of the particular breed such as size, color, temperament, ruggedness of build, etc..... | 10 | | | | |
| Name..... | Cut | | | | |
| Date..... Class..... | Score | | | | |

Method of Judging Dairy Cattle.—If one expects to become a good judge of dairy cattle, the first step is to make a careful study of the correct form or type and by so doing to fix in mind a picture of the ideal animal. This can best be accomplished through the use of ideal type models or pictures and through use of slides or pictures of representative animals of the different breeds. The next step is to train the eye properly to compare the animals to be judged and to ascertain the deficiencies as compared with the mental picture of the ideal animal.

It is essential in all types of judging that the club member first familiarize himself with the different parts of the dairy animal and their correct form.

Milk production is the primary function of the dairy cow, and dairy judging is based on the fact that there is a correlation between the form of the animal and her ability to produce milk. Though there are certain, particular characteristics common to one breed alone, such as color, size and special conformation of the body, the chief characteristics of the dairy cow are common to all breeds and may be termed the essentials of a dairy cow. A general score card, listing those points and ascribing a definite numerical value to each, has been prepared. It lists and describes each part in groups under the following heads:

1. Style and general appearance.
2. Dairy conformation.
3. Constitution.
4. Capacity for feed.
5. Development of milk secreting organs.

(See score card. Page 36.)

Method of Procedure in Judging.—In order to judge dairy cattle intelligently, it is necessary to understand the relative importance of each part of the animal. The general score card serves as a means of acquiring this knowledge.

The best way to become familiar with the score card is to make use of it in scoring a few animals. Care must be taken, however, not to use the score card to such an extent that one becomes dependent upon it for judging. It should be used only in the beginning as an aid in formulating a mental picture of the ideal animal. After the score card has been used a few times, comparative judging should be started by placing a group of cows according to their merits as dairy animals.

The animals should first be compared as a whole rather than as a mass of individual parts, and should be viewed at a distance of not less than fifteen or twenty feet. They should be viewed from the side, rear, and front, comparing them for the points listed above.

Too often, the beginner in judging makes first a detailed examination

of the animal from a close-up view and feels the animal, and then from a mass of details thus secured, tries to make a decision. It is much easier to place the animals from their general appearance at a distance of twenty feet, and then to feel them over and closely examine details in order to confirm the first decision.

The close-up examination should consist of feeling the hide to ascertain quality, feeling the ribs to ascertain whether the eye was misled by a covering of flesh, examining the udder for quality, ascertaining the number and size of the milk wells, and the size and tortuousness of the milk veins.



Fig. 3.—Judging dairy cattle at the State 4-H Club Round-Up, Missouri College of Agriculture, Columbia, Missouri

In comparing the deficiencies and the points of superiority of two animals, it should be remembered that while the importance of each part is proportionate to the rank on the score card, if a very marked deficiency should occur, a greater cut should be made than is allowed in the score card. For example, the loin is allowed three points on the score card, yet an animal having a very weak, low loin would be cut severely.

Judging Young Dairy Stock.—In judging immature classes, the same things are looked for as in mature animals, but as some of the most important points are not developed in the young animals, the indication for development must be taken into consideration. This is particularly true of the mammary development. The younger the animal, the less

development of udder and veins is to be expected, but several things to be considered indicate future development.

In judging a class of young heifers, the udder should be examined carefully for uniformity of quarters and teats, length and width of udder, rear and fore attachments and quality of udder. Close examination will also reveal the length and tortuousness of the milk veins.

In dairy conformation, the same refinement is looked for as in older animals, although care must be taken to differentiate between animals in good condition and a tendency toward beefiness, as young animals are generally in good condition. Springing heifers that have been properly fed usually carry much fat and are sometimes said to be coarse over the withers when this is due to accumulation of fat that will come off when they freshen.

Judging Dairy Bulls.—In judging dairy bulls, the same essentials are looked for as in judging dairy cows; namely, constitution, capacity for feed, dairy conformation, style and general appearance, and development of rudimentary mammary system. In addition to this, it is important that the bull also possess masculinity.

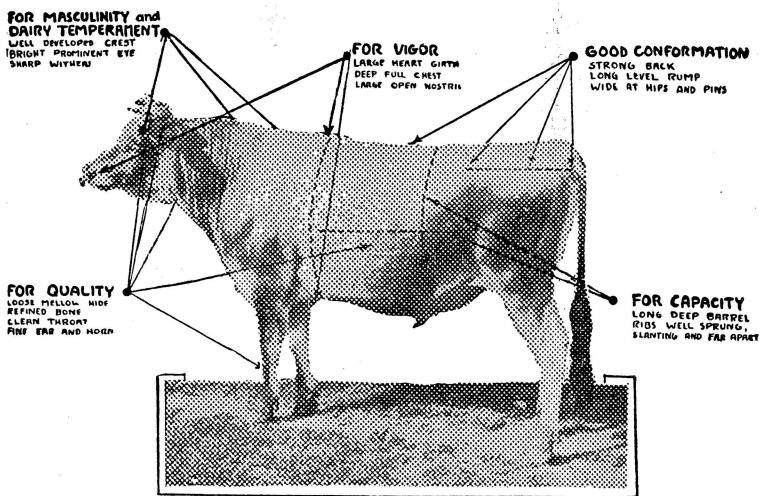


Fig. 4.—A typical high type dairy bull with important points designated. (Used through courtesy of the dairy husbandry department, University of Missouri.)

Masculinity is indicated by a broader head with thicker and straighter horns than those of the cow. The neck is wider with a well developed crest on top and the shoulders are more prominent than those of the cow. Care must be taken to differentiate between coarseness and masculinity in development of these parts.

Giving Reasons.—In a judging contest, the giving of either oral or written reasons is very important. It is customary to give equal weight to both reasons and placing. A class, therefore, may be placed correctly and if no reasons are given, the contestant would get a rating of 50 out of a possible 100 points.

In giving reasons, show why an animal is superior to the one over which it is placed, and do not give points of inferiority. Make reasons comparative rather than descriptive and present them in logical order. It is well to summarize under the leading heads of the score card the reasons for placing one animal above another and then give details in succession under each head. The reasons should be brief and specific. General terms as “better” and “best” should be avoided and good descriptive terms used instead.

Listed below are a number of descriptive terms used in referring to dairy cattle.

Descriptive Terms Used in Referring to Dairy Cattle

1. *Pertaining to General Conformation and Appearance.*—Superior dairy or breed type, more size and scale, superior balance, neater, more style.

2. *Pertaining to Milk Secreting System.*—Udder or mammary system well developed, symmetrical, attached high behind, extends well forward, level floor, shows good balance, is of fine texture, full, pliable, soft, mellow, elastic; shows lack of development, deficient in fore or rear quarters, quartered, divided, tilted, funnel shaped, pendulous, meaty, hard, non-elastic; teats of convenient size and well placed, udder veins plainly visible, milk veins large; long, tortuous, crooked, branching, entering large wells.

3. *Pertaining to Body.*—Long, deep, close-coupled, shallow barrel, capacious, roomy, lacking in barrel capacity, cut up in middle, good spring of rib, slab sided, ribs wide apart, set too close together, straight, strong back, low weak back.

4. *Pertaining to Hind Quarters.*—Rump, long, level, carries out well to tail head, hocks and pin bones prominent, high and wide apart, level between hocks and pin bones. Neat, level tail head, rough, high, prominent, pinched tail head. Hind quarters trim, not meaty or beefy. Thigh thin.

5. *Pertaining to Fore Quarters.*—Light, trim, well laid in over shoulders, sharp withers, shoulders smooth and sloping. Heavy over shoulders, coarse and blunt over withers, falls off in crops, rough over shoulders. Chest deep, full and wide at floor, showing good constitution, large heart girth, shallow or narrow chested.

6. *Pertaining to Head and Neck.*—Neck refined, long, neatly

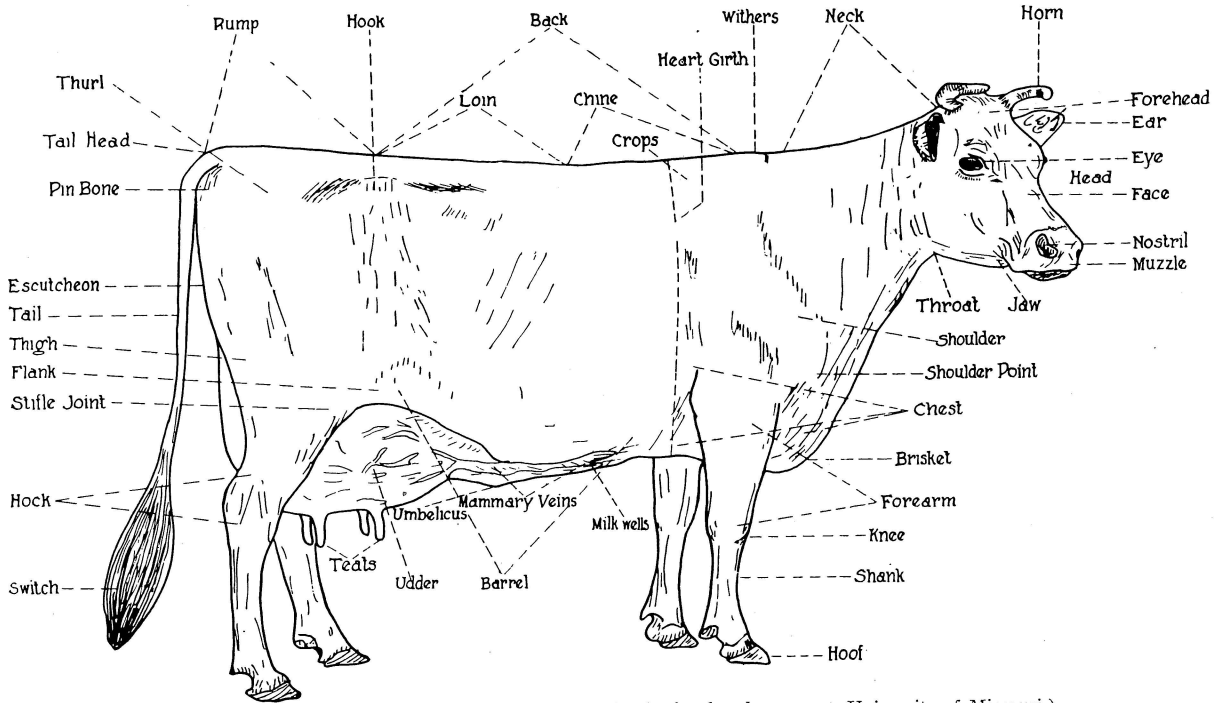


Fig. 5.—Parts of a dairy cow. (Used through courtesy of the dairy husbandry department, University of Missouri.)

joined to head and shoulders, brisket lean and light, throat clean. Neck coarse, heavy, ewe-necked. Head clean cut, forehead broad and dished, ears fine, eyes large and bright. Broad, strong muzzle, large open nostril, strong clean cut jaw, shows femininity or sex character, characteristic of breed type. Dull eye, listless appearance, coarse, bullish head.

7. *Pertaining to Temperament.*—Superior dairy temperament, more angularity throughout, prominent hocks and pin bones, sharp withers, wedge-shape, nervous, irritable, or placid, gentle disposition.

8. *Pertaining to Quality.*—Fine silky hair, loose, mellow hide, superior handling qualities, fine bones, coarse hair, tight, harsh hided, board hide, poor handler, raw boned.

9. *General Terminology.*—Avoid too much repetition. Avoid the use of “better” as in saying “better barrel”, “better head”. Instead, tell why it is better, as “larger, more capacious barrel,” “more feminine head.”

V. REQUIREMENTS OF A DAIRY RATION

Now that we have found out the composition of different feeds, we have taken our first step towards learning how to select a ration that will get the most results at least cost. Before we take up our discussion on selecting rations, however, there are some other things we should consider about the different feeds and their effects on the animal. A ration might be balanced and contain just what the cow needs to make milk and yet not be good for the cow because there is something about it to make it unhealthy.

So that in addition to the four chief constituents of a ration which we have studied, we should keep in mind the following six factors whenever we start to select a ration:

A succulent feed when given with other roughages and grains renders them more palatable and aids in their digestion. For instance, June grass pasture is nature's best feed for the dairy cow, although it contains 80 per cent water. Corn silage is perhaps our best and most economical succulent feed since roots and soiling crops, though capable of serving the same purpose, are usually more expensive. Beet pulp and molasses are not succulent feeds, but where there is no succulent feed, either makes a desirable addition to the ration since both exert a beneficial effect on the bowels.

Palatability is important, for it is essential that a cow's feed appeals to her appetite. Make the feed palatable by keeping the mangers clean and by feeding three or more different grains. Greatest returns may be expected only when the cow enjoys her feed.

Variety in the ration means palatability and gives greater assurance of sufficient mineral matter in the ration. While variety is not so essential

for low producing cows, it is desirable to have at least four plants represented in the entire ration, including both roughage and grain feeds.

Bulk is necessary because a cow's stomach is especially adapted to handle bulky feeds. A ration deficient in roughage does not seem to satisfy the cow regardless of the amount of grain she receives. Bulk is closely associated with palatability. Therefore, in choosing bulky feeds, dry roughages such as hay are usually not sufficient but some succulence such as silage or roots seems necessary to bring about an ideal condition.

Economy in feed selection often means the difference between profit and loss. Home grown feeds usually furnish nutrients more cheaply than they can be purchased. Usually, therefore, every dairyman should grow all the feed possible and when necessary to purchase feeding stuffs, select those which furnish the nutrients desired most economically.

Low cost of nutrients, rather than low price per hundred-weight, is the proper measure of the relative economy of feeding stuff. Dividing the cost of 100 pounds of feeding stuff by the pounds of digestible protein which it contains gives the cost of a pound of protein in that particular feed. In like manner dividing the cost of 100 pounds of a feed by the amount of energy gives the cost per pound of total nutrients.

For example, it is desired to determine whether cottonseed meal or linseed oil meal is the more economical when either can be bought for \$50 per ton or \$2.50 per hundred-weight. One hundred pounds of cottonseed meal contains 37 pounds of digestible crude protein. Dividing \$2.50 by 37 we get $6\frac{3}{4}$ cents as the cost of 1 pound of digestible crude protein. In like manner, 100 pounds of linseed meal contains 30.2 pounds of digestible crude protein. Dividing \$2.50 by 30.2 we find that the protein supplied by linseed oil meal costs $8\frac{1}{4}$ cents a pound. The relative cost of energy feeds is determined in a similar manner. The figures thus obtained are worthy of consideration by every feeder as they denote the relative cost of the really useful, growth-promoting, milk-stimulating, food nutrients.

It must be remembered, however, that the best rations cannot be computed on the basis of costs alone, but consideration must be given to balance of nutrients, succulence, palatability, variety, and bulk. As a fundamental principle, however, it is well to determine the cost per pound of nutrients in available feeding stuffs. The feeder is then in a position to select those feeds which mixed together will furnish all the requirements of a good ration. It must also be borne in mind that this method of studying the comparative economy of feeding stuffs, while fairly accurate when feeds of similar composition and general characteristics are compared, is not altogether applicable when feeding stuffs of widely varying composition and characteristics are considered.

Balance of nutrients is essential. If we are to get maximum profits

from our cows, we must supply nutrients in such quantities and of such quality as to keep them at their maximum production. In other words, we must furnish our cows with water, mineral matter, protein and energy feeds in the amounts needed or our production will be reduced and much of our feed wasted.

Selecting Rations for Milk Cows.—The first thing to consider in selecting a ration is the feeds available, especially the kinds of roughage, and with particular reference to whether a leguminous hay and a succulent feed are available. The second step is to select a grain mixture that, with the roughages available, is best suited for general use, and then to feed it to the whole milking herd according to the individual requirements of the cows.

Every dairy farmer welcomes the time when he can turn his cattle out to pasture, for experience has taught him that it is late spring or early summer when the cows are on luxuriant pasture that the dairy herd normally reaches the maximum production of the year. Pasture grass furnishes the choicest feed for dairy cattle, for not only is the supply of nutrients liberal but also the feed is palatable and succulent, and good pasture is rich in protein, mineral matter, and vitamins.

Combinations of hay, silage or roots, and suitable grain make desirable and profitable rations for dairy cows when all other conditions relating to care and management are satisfactory. Good alfalfa, clover, soybean, or cowpea hay, together with good corn silage, and a well selected concentrate mixture, provides a ration that is approximately equal to good pasture. The better the hay and silage which constitute the roughage, the simpler the grain mixture can be. When silage or roots and legume hays are not available, more expensive grain mixtures and more liberal feeding of them is necessary.

We are now ready for the thing which we have been preparing for every since we started this series of discussions on feeding. We are ready to select the best ration for our cows. To start with, we want to consider what kind of roughage we have, and then select grain rations to go with the feed we now have on hand. We have already learned that there are two distinct kinds of roughages. One of these is that which contains plenty of protein and mineral matter. We usually refer to this group as legume hays. It included alfalfa, soybeans, clover and cowpeas. The other group contains quite a bit of energy food but little protein or mineral matter. It includes corn silage, corn stover, kafir, sorghum hay, orchard grass, timothy, oat hay, and millet.

Naturally, on any farm we have either (1) a roughage or combination of roughages that is high in protein, or (2) a roughage or group of roughages that is low in protein, or (3) a roughage that is high in protein and one that is low in protein. Keeping this in mind, all we need to do

is to find out what kind of rough feed we have and pick out a suitable grain ration to go with it. In the following rations it will be seen that we use a greater proportion of high protein grain feed where we do not have a legume hay.

Medium Protein Roughages.—Silage, roots or other non-legumes when fed in approximately equivalent portions with alfalfa, clover, cowpea, soybean, or other leguminous roughages, give the best results. The following grain mixture is well suited to this type of roughage:

400 lbs. ground corn
200 lbs. wheat bran
100 lbs. cottonseed meal or
100 lbs. linseed oil meal.

Low Protein Roughages.—Silage, roots, timothy hay, corn stover, mixed hay and other non-legumes, or any combination of these roughages in order to give satisfactory results should be fed with such a grain mixture as listed below:

100 lbs. ground corn
100 lbs. wheat bran
100 lbs. cottonseed meal or
100 lbs. cracked soybeans.

High Protein Roughages.—Alfalfa, clover, cowpea, soybean or other legumes, singly or in any combination gives good results with such a grain mixture as here suggested:

300 lbs. ground corn
100 lbs. wheat bran
50 lbs. cottonseed meal.

Under usual herd practices, ground corn, hominy feed, corn-and-cob meal, ground barley, ground wheat, and similar feeds may be regarded as of practically equal feeding value, and any one or any combination of two or more may be substituted for any other pound for pound. In like manner, wheat bran and ground oats may be substituted one for the other and in a similar manner cottonseed meal, linseed oil meal, gluten feed and cracked soybeans may be substituted pound for pound for each other.

Feeding Recommendations.—We have now learned about the constituents of different feeds and the purpose of each. We have also learned the requirements of a dairy ration and how to select a ration to fit our needs. Our next and last step is to learn how much of this feed to give to different cows under different conditions and at different seasons.

*For the Winter Ration**.—(1). Feed all the roughage the cow will clean up. This will be approximately 3 pounds of corn silage and 1 pound of hay, or 5 to 6 pounds of roots and 1 pound of hay, or 1 pound of dried beet pulp soaked 12 to 24 hours before feeding and 1 pound of hay, or 2 pounds of legume hay or other dried roughage, for each 100 pounds of live weight. Where at all possible, it is desirable that both a succulent feed and a leguminous hay be used in the roughage portion of the ration. The most economical production of milk is not ordinarily otherwise possible.

(2). Feed the grain mixture according to the amount of milk produced. This means about 1 pound of concentrates for each 3 to 3½ pounds of milk produced in the case of a Jersey or Guernsey, or for each 3½ to 4 pounds of milk produced when feeding to an Ayrshire, Brown Swiss, or Holstein.

For the Cow on Pasture.—Many farmers make the mistake of turning their cattle on pasture too early in the spring. This not only reduces the amount of grass for the rest of the season but also is apt to cause a fall in the milk yield of the cow, for this early pasturage is so watery that the cows cannot consume enough of it to maintain their production. It is best to wait until the grass is more mature and also to continue giving the cows some hay and silage and some grain in the barn for a time after they are turned on pasture. Some good rules for summer feeding follow.

When on good pasture, it is not usually economical to feed grain to cows producing small to average quantities of milk, but heavy producers require more nutrients than they can get from the grass alone. One point of importance that has been observed in connection with feeding of grain on pasture is that cows receiving grain produce better after the pasture season is over and this should be taken into account in considering the advisability of feeding grain.

The grain mixtures suggested for winter feeding are equally suitable for summer feeding, excepting: (a) it is often desirable to reduce the proportions of heating feeds such as corn and of laxative feeds such as oil meal, and (b) the proportion of high protein feeds such as cottonseed meal, gluten feed, or linseed oil meal may usually be reduced about one-fourth to one-third with economy.

A Jersey or Guernsey cow producing as much as 20 pounds of milk daily should receive while on pasture about 3 pounds of grain and in the case of heavier producers one additional pound for each 3½ pounds of milk up to 30 pounds. For a production of more than 30 pounds of milk, an extra pound of the grain mixture should be given for each additional 2½ to 3 pounds of milk produced. A cow producing 40 pounds of milk

*From Missouri Experiment Station Circular 115, by Prof. A. C. Ragsdale.

daily will thus receive about 10 pounds of the grain mixture and about 14 pounds for a production of 50 pounds. In the case of a Holstein, Brown Swiss, or Ayrshire, feed 3 pounds of the grain mixture if the daily milk production is as much as 25 pounds. Feed an extra pound for each additional $3\frac{1}{2}$ pounds of milk produced up to 50 pounds. A cow producing 50 pounds of milk daily would thus receive approximately 10 pounds of the grain mixture. For a production above 50 pounds, it will usually require an extra pound of grain for each additional 3 pounds of milk produced.

During the periods when the pastures are short, supplement them with silage or some green feed in addition to the grain mixture. If this is not done, cows will drop in milk flow and run down in flesh so that they cannot be brought back to a satisfactory milk flow during the following winter. If soiling crops are used, it is necessary to feed 40 to 50 pounds or more to supply as much dry matter as 30 pounds of silage or 10 pounds of hay. Under Missouri conditions, silage is usually more economical than soiling crops for supplementing short pastures.

General Consideration.—The particular order of feeding grain and roughage is not one of importance, for when grain and hay are eaten separately they are thoroughly mixed in the paunch of the cow. It may be said, however, that in most instances the cow seems better satisfied when the grain is given first, and with it out of the way, she fills up on the roughages before her. Hay and other dry roughages also fill the air with dust which may interfere with milking. Silage, turnips, or other feeds with a marked odor should be given only after milking.

The live weight of a cow is a good indication as to whether or not she is being fed a proper amount, but good judgment must be used in regulating the ration by observing this condition. It is expected that a cow will lose weight during the first few weeks of her lactation period, and that she will gain in weight toward the end of the milking period.

Heifers in milk will naturally require somewhat more feed than mature cows yielding the same amount of milk because they require some nutrients for growth as well as for maintenance and milk production. Liberal feeding of the heifers results not only in larger immediate production but makes greater profits possible throughout the life of the heifer.

Feeding Dry Cows.—Largest profit during the milking period may be expected only from cows which have been put in good condition during the dry period. Cows that are thin at calving time never have an opportunity to do their best.

Silage and a legume hay are the best foundation of a ration for the heifer or dry cow. The fitting ration should be fed liberally (from 7 to 12 pounds a day) for a period of four to six weeks before calving, ex-

cepting that within a week or ten days of calving it is best to change to a lighter and mildly laxative ration. Equal parts of corn or hominy feed, wheat bran, ground oats, and from 10 to 25 per cent of linseed oil meal approaches the ideal as a grain mixture for the preparation period. A week or ten days before calving time, materially reduce or eliminate the corn from the grain mixture and reduce the amount of grain given to from 3 to 7 pounds per day. For the first few days after calving, a bran mash or the same grain mixture which was used the week before calving is very satisfactory. If everything goes right, the change to the milking ration may be begun three or four days after calving. The feed will then be increased to the limit of the cow's appetite. Experience indicates that this increase should not be more than 1 pound per day, excepting in rare cases where the feeder knows his individual cow.

Fitting the Cow for the Show.—While the average club member does not want to become a professional showman, yet there are a few simple rules which the members should observe in getting the cows ready for the club show. Some of these are:



Fig. 6.—The 4-H Dairy Club Round-Up.

1. Cows should be sleek and show a good quality of skin and hair. There are two good methods of accomplishing this. One is to keep the cow up with a blanket over her for a while before the show, and the other is to add a little extra laxative feed like oil meal or wheat bran to the grain ration for a month or so before the show. Curryng well at least once a day will help, too.

2. The animals should have a neat and clean-cut appearance,

especially about the head and ears. Sometimes clipping the long hair will help the appearance of a cow remarkably.

3. The cow should be broken to lead before the show and should be led in with a neat halter, the member walking on the left side of the animal. It is possible to make a very nice looking halter out of an ordinary small rope.

4. If the horns have been allowed to grow and the horns and hoofs are rough, sometimes it is well to smooth them off with a little sandpaper.

5. Especial care should be taken to keep the cow in good physical condition, especially just before the show.

6. Clean the cow thoroughly before leading her into the show ring. No judge can place an animal up if it is covered with dirt and filth. Besides that, any good club member would be ashamed of his animal in that condition. A little time with a bucket of water and a brush will be well spent. The following outline should be used.

- (a). Wash the animal with tar soap.
- (b). Train horns. Shorten long, coarse horns with a rasp. Scrape horns with glass or mower section, smooth with paste, pumice stone and sweet oil. Smooth with emery paper. Polish with sweet oil or metal polish. Feet should be trimmed squarely to allow animal to stand.
- (c). Groom daily, using soft brush.
- (d). Sponge daily, using a bucket of water to which has been added one teaspoonful of tincture of green soap. Then hand rub the animal.
- (e). Keep the animal blanketed. The blanket may be made from burlap sacks.
- (f). Keep animals in dark stall away from flies during the day. They may be allowed on pasture at night.
- (g). Feed a mixture of one part wheat bran, one part ground oats, one part ground corn, and one-half oil meal with legume hay. The amount of grain to feed should be governed by the condition of the animal.
- (h). Ten days or a week before the show, clip the head and neck, belly, udder and tail.
- (i). The cow should be trained to stand, pose, and to be led each day so that at show time she may be shown to advantage. An untrained cow never wins many prizes.

VI. DEMONSTRATIONS

The Demonstration as a Method of Learning and Teaching.—

In so far as possible, all club members should be instructed in the regular club meetings by the demonstration method. As a usual thing, one or more members of each club can begin doing before the club useful phases of the work program soon after the processes have been demonstrated to the club by the club leader.

After two or three months of practical experience in handling real things, all mature club members should be able to give public team demonstrations. The scope of the team demonstration usually should be limited to the essential processes of one phase of the club work of the current year. A team of two or three of the best demonstrators, according to the number needed, should be selected from the membership of one club by individual try-outs in competition. All teams should have an opportunity to demonstrate before the local club group and the people of the home community, and the championship team should represent the local club at the county round-up, if one is held.

SUGGESTED SUBJECTS FOR TEAM DEMONSTRATIONS

1. A dairy judging demonstration.
2. Testing milk by use of the Babcock Tester.
3. Preparing the dairy animal for the show ring.
4. Care of the separator on the farm.
5. Model milk house, planned to save steps.
6. Systematic record keeping.
7. Making a practical blanket for the dairy cow.
8. Methods of handling a dairy animal.

Any practical problem of importance regarding the dairy cow project which lends itself to demonstration purposes, may be given.

Dairy Feeding

(Suggested Demonstration Outline)

Project: For members of the 4-H Dairy Cow Club.

Team: For a team of two members from one club group, designated in this outline as "A" and "B".

Reference: Feeding Dairy Cows.—Experiment Station Circular No. 115, University of Missouri.

Equipment Needed: Scales, small feed scoop, feed bucket, scoop shovel, silage basket, and mixing trough or tight bin floor. Feeds as follows: 300 pounds of corn chop, 200 pounds of bran or crushed oats, 125 pounds of oilmeal or cottonseed meal, 20 pounds of bone meal, and 10 pounds of charcoal, or smaller amounts of each feed in the same proportions. Also, 30 pounds of corn silage and 10 pounds of legume hay.

Time: Twenty to thirty minutes.

A speaks and demonstrates

A leads in giving a spirited club song or in repeating the National 4-H Club pledge; gives a brief history of the club; introduces the team; and then announces the problem which the team will demonstrate.

A explains the feeding needs of each cow which includes water, mineral matter, protein and carbohydrates, explaining that no one will replace the other.

A cow producing 3 gallons of milk daily must have about 15 gallons of water a day and she must have about 4 additional gallons of water for each additional gallon of milk produced.

Milk is very high in mineral content, especially lime. A quart of milk contains as much lime as 33 pounds of beef steak or 23 pounds of potatoes. This lime in the human body goes toward building teeth bones and strong frames. But the cow, in order to produce plenty of milk must have feeds containing plenty of mineral.

We secure this partly by adding some mineral such as bone meal to the ration. Our chief source of mineral, however, should be from a legume hay. An illustration of the value of legumes as compared to non-legumes is shown by the fact that it takes 43 pounds of timothy to provide enough lime for a gallon of milk, while 6 pounds of alfalfa provides the same amount of lime. A dairy cow should have all the legume hay she will clean up once a day during the entire feeding season. This will usually be about 10 pounds per day. Charcoal is another mineral which is added chiefly because of its value as a conditioner and in absorbing gases from the digestive tract.

A third constituent in milk is protein. In our own bodies this protein goes largely into making skin, hair, bones, blood and muscles. A dairy cow must have about seven-tenths of a pound of protein to keep her alive and about half a pound more protein for each gallon of milk. Some feeds contain a great deal of protein while others contain very little of it. A ton of soybean hay contains as much protein as four tons of timothy hay. Legume hays are our cheapest source of protein and we should feed liberal amounts of them for that purpose. But a heavy producing cow cannot get enough protein from her hay alone. Cottonseed meal, oil meal, or cracked soybeans are our cheapest sources of protein in the grain ration, and a good grain ration should contain about $\frac{1}{2}$ part by weight of one of these.

The fourth constituent in milk is the carbohydrates. This includes butterfat

B assists

B joins in giving club song or pledge. Stands at attention.

Weights up the proper amounts and puts grain in the mixing trough, ready for mixing as A refers to them in his explanation.

and milk sugar. The cheapest and most palatable source of carbohydrate feeds in the roughage is corn silage. A cow should have all of this that she will clean up once a day. This will usually be about 30 pounds.

A good producing cow cannot get enough carbohydrate feeds in her roughage, however, and should have some of this class of feeds in her grain. Ground corn is almost always the cheapest source of this constituent and a good ration will contain about 50% by weight of corn chop.

Then, in order to make the grain ration easily digested and to keep it from packing in the cow's stomach, we add about $\frac{1}{2}$ part by weight of some bulky feed like bran or crushed oats.

"-----" will continue the demonstration."

A assists

A mixes the ration thoroughly with a scoop shovel.

Weighs out amount of feed needed as a daily ration for a cow producing 35 lbs. of 4% milk daily.

Collects equipment.

Stands at attention.

Answers questions referred to him on his part of the demonstration.

Joins in club song or yell.

B speaks and demonstrates

B explains (1) why thorough mixing is necessary. (2) This ration furnishes all of the requirements of a good dairy ration because—

- (a). It contains a good succulent feed in the form of silage.
- (b). It contains plenty of variety and for that reason is a good palatable feed.
- (c). It is sufficiently bulky to make it easily digested.
- (d). It contains all of the nutrients essential to the production of milk and in just the right amounts so that none are wasted.
- (e). It contains those feeds which furnish the desired nutrients most economically. Explains the amount of feed both of roughage and grain, that a cow producing 35 pounds of milk daily should have: All of the legume hay she will clean up once daily; all of the silage she will clean up once daily; and one pound of grain for each $3\frac{1}{2}$ pounds of milk produced.

Summarizes briefly points brought out in demonstration.

Asks for questions

Leads in club song or yell.

Concludes by thanking audience for its attention.

Keeping Records of Dairy Cows

(Suggested Demonstration Outline)

Project: For members of the 4-H Dairy Cow Club.

Team: For a team of two members from one club group, designated in this outline as "A" and "B".

References: Testing Milk and Cream, Missouri Experiment Station Circular No. 119, Columbia, Missouri.

Equipment Needed: Babcock tester including milk test bottles, pipette, acid measure, commercial sulphuric acid, dairy thermometer, hot water, blackboard, and daily milk record sheet.

Time: Twenty to thirty minutes.

| <i>A speaks</i> | <i>B assists</i> |
|---|--|
| <p>A leads in giving a spirited club song or in repeating the 4-H club pledge; gives a brief history of the club; introduces his team-mate and himself; and announces the problem which the team will demonstrate.</p> <p>1. Keeping Records on Dairy Cows.—</p> <p>(1). Why the keeping of records on dairy cows is essential.</p> <p>(2). The purpose of this demonstration.</p> <p>(3). Names the operations or steps necessary to test milk.</p> <p>(4). Prepares samples for testing and explains processes.—</p> <p>a. Cools (or warms) both the milk sample and the acid to about 65° or 70° F.</p> <p>b. Mixes the milk sample by pouring from one bottle to another.</p> <p>c. Measures out the samples of milk with the pipette and puts the samples into the test bottles.</p> <p>d. Measures out the acid in the acid measures and adds it to the milk samples, and then shakes the samples until thoroughly mixed and puts them into the machine.</p> <p>“-----” will continue the demonstration”.</p> | <p>B joins in giving club song or pledge. Stands at attention.</p> <p>Gets equipment and supplies ready for testing.</p> <p>Assists A.</p> |
| <p style="text-align: center;"><i>A assists</i></p> <p>Turns the machine for five minutes.</p> | <p style="text-align: center;"><i>B speaks and demonstrates</i></p> <p>2. Demonstrates and explains the use of the Babcock tester.—</p> <p>(1). Explains the centrifugal process while A is turning machine. At the end of five minutes, adds hot water up to the neck of the bottles.</p> |

| | |
|---|---|
| After the hot water is added, turns the machine for two minutes more. | (3). While A is turning the machine, explains the action of the acid and the purpose of adding water. |
| After the hot water is added, turns the machine for one minute. | (4). Adds enough hot water to a little more than half fill the neck of the bottles. |
| Totals up the milk record sheet for the month. | (5). Prepares a hot water bath (135° F.) and puts the samples in it for five minutes. |
| | (6). Explains the milk record sheet for the month. |
| | "-----" will summarize the demonstration." |
| <i>A speaks</i> | <i>B assists</i> |
| Summarizes briefly the points made in the demonstration. | Stands at attention. |
| Asks for questions. | Answers questions referred to him on his part of the demonstration. |
| Leads in giving a club song or yell. | Joins in giving club song or yell. |
| Concludes by thanking the audience for its attention. | |

Producing Clean Milk

(Suggested Demonstration Outline)

Project: Preferably for members of the 4-H Dairy Cow Club.

Team: For a team of two members from one club group, designated in this outline as "A" and "B".

References: U. S. D. A. Farmers' Bulletin 602. U. S. D. A. Farmers' Bulletin 1018.

Equipment Needed: Curry comb, heavy brush, bucket of water, a clean cloth, a covered-top milk pail, a sanitary strainer, and a small water cooler.

Time Required: About fifteen to twenty minutes.

| | |
|---|--|
| <i>A speaks and demonstrates</i> | <i>B assists</i> |
| A leads in giving a spirited club song or in repeating the 4-H club pledge; gives a brief history of the club; introduces his team-mate and himself; and announces the problem which the team will demonstrate. | B joins in giving club song or pledge. |
| A explains the reasons why it is important to produce clean milk: | Stands at attention. |
| 1. Dirty milk often contains disease germs which are dangerous to human health. | B curries and brushes the cow's back, sides, belly and tail. Washes udder. |
| 2. Dirt and filth contain bacteria which cause souring and decay in the milk. | Milks the cow in a covered top pail, being careful to milk with dry hands. |
| 3. Where whole milk or sweet cream is sold, much loss results from "souring", being turned back unless care is taken. | |
| 4. Even sour cream brings a much lower price if allowed to spoil on account of filth. | |

5. Sour cream in Missouri ordinarily brings 6 to 10 cents less per pound than in Wisconsin, Minnesota and other leading dairy sections, and this difference on 50,000,000 pounds of butterfat a year means a loss of about \$300,000 a year to Missouri farmers.
 6. The difference in price is largely due to the difference in quality of cream.
 7. Most of the filth in milk gets in at milking times and most of the bacterial growth after that is due to the milk or cream being kept warm.
 8. Both of these faults can be easily overcome by keeping the milk clean and by cooling the milk immediately after milking.
 9. Explains the operations B has gone through in cleaning the cow, using a covered pail, and milking dry handed.
- “-----” will continue the demonstration.”

A assists

A takes the milk and strains through a sanitary strainer.
They pour the milk over a small water cooler and aerator.

Collects equipment.
Answers questions referred to him on his part of the demonstration.
Joins in club song or yell.

B speaks and demonstrates

B continues explaining demonstration:

1. Explains why the sanitary strainer and filter is needed to remove all possible dirt or filth.
2. Explains why cooling and aeration is necessary.
3. Aeration takes out all possible odors.
4. Bacteria double in number every few minutes in warm milk while in cool milk they increase very slowly, so it is important to cool it at once.
5. Water will cool milk twenty-six times as fast as air at the same temperature.
6. Summarizes briefly the points brought out in the demonstrations.

Asks for questions.
Leads in club song or yell.
Concludes by thanking the audience for its attention.

SCORE CARD FOR JUDGING DEMONSTRATION TEAMS IN MISSOURI

| | Perfect Score | Actual Score |
|---|------------------|-----------------|
| 1. Subject Matter ----- (1) Importance of the subject-matter presented and relation to fundamental problems of home or farm. (2) Accuracy of statements made in oral presentation and proper methods in doing the work. (3) Completeness with reference to the giving of all steps necessary to clear understanding of process. (4) Clearness and definiteness of statements made in simple language easily understood. (5) Replies to practical questions. Judges' questions only should be considered in team scores. Team should give authority for subject-matter presented. | 30 | |
| 2. Team Work ----- (1) Preparation, arrangement and use of materials. The team will be responsible for the arrangement and preparation of equipment and its use. (2) Organization of work, each member in so far as practical to be kept busy with a definite part so that the work and instructions given will proceed without delay, but each member of the team should be able to demonstrate the whole process. (3) Appearance and conduct of the team. Appearance and conduct include the personal appearance of the members, and of the team as a whole. They should be businesslike, pleasant and in so far as possible, a unit in action and appearance. (4) The team member not actually directing the demonstration should reinforce the point at hand or at least should not detract from the theme of the demonstration. | 20 | |
| 3. Skill ----- (1) Ease in procedure. (2) Workmanship and efficiency of manipulation. (3) Neatness and cleanliness in doing work. (4) Speed, system or dispatch. | 20 | |
| 4. Results ----- (1) Effect upon the audience, and also upon materials used in the demonstration, as may be shown in the finished product. (2) All processes made clear. | 15 | |
| 5. Practicability ----- (1) Value of principles given for the home and community. (2) Actual club practices shown. | 15 | |
| Total Score----- | 100 | |

Date----- Demonstration Team-----

Signed----- (Judge)