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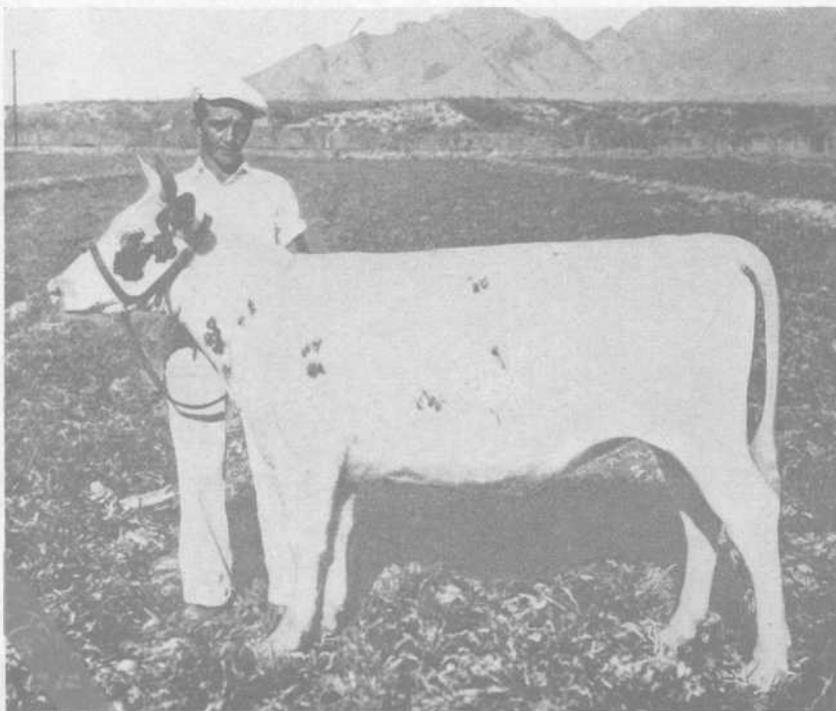
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**University of Arizona**  
College of Agriculture  
Agricultural Extension Service

**MANUAL FOR DAIRY CLUB MEMBERS**

By  
H. R. BAKER  
W. S. CUNNINGHAM



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P. H. Ross, *Director*

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## CLUB EMBLEM

The four-leaf clover with an "H" on each leaflet is the national Boys' and Girls' Club emblem. The four "H's" stand for the equal training of the head, heart, hands, and for health.

## CLUB PLEDGE

As a true club member 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.

## CLUB MOTTO

"Make the Best Better"

## REQUIREMENTS FOR STANDARD DAIRY CLUBS

The requirements for standard dairy clubs are as follows:

1. Five or more club members enrolled in the dairy project. Members must be between the ages of 10 and 20, inclusive.
2. Club members must do their own work and attend club meetings regularly.
3. Complete records must be kept and a final report handed in.
4. A local leader in charge of the club.
5. A complete set of officers elected from the club members.
6. A program of work for the year.
7. An Achievement Day at the completion of the year's work.



# MANUAL FOR DAIRY CLUB MEMBERS

By

H. R. BAKER

W. S. CUNNINGHAM

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4-H club work is administered by the Agricultural Extension Service of the University of Arizona and the United States Department of Agriculture in cooperation with the rural communities throughout the State. Approximately a million boys and girls were enrolled in 4-H club work in the United States in 1933 and there were over twenty-five hundred enrolled club members in the state of Arizona. These club boys and girls learn by actually doing with their hands certain assigned tasks. Their work is supplemented with study and mixed with wholesome play.

Club work teaches them the better methods of feeding a calf, correct canning principles, and like practices; the keeping of records; gives them responsibility; trains them for better citizenship, and develops leadership. The majority earn some money in their project work and many have used such funds to meet college expenses. Another important result of club work is that it creates and develops an interest in the home, farm, or ranch and offers an opportunity to interest the boy or girl in something worthwhile for spare moments. Even though one may not expect to become a farmer, the training received is very valuable to the individual.

Inasmuch as dairying is one of the more important agricultural enterprises in Arizona, the dairy projects receive a great deal of attention from 4-H club members over the State. The advantages of the dairy project are many. Not only does the club member receive good training in the feeding and management of dairy animals, but the dairy industry, as a whole, is benefited through the introduction of purebred animals as well as better methods of management.

The first three years of dairy project work carry the calf through to maturity, while the fourth year constitutes the keeping of herd improvement records on either the cows owned by the club member or the home herd.

The four years of dairy club work are as follows:  
First year—Dairy calf.

This first year of dairy club work includes the care, feeding, and management of the dairy calf. The calf should be

owned by the club member and complete records of *labor, feed and miscellaneous expenses* must be kept. An exhibit should be made at the completion of the year's work.

#### Second year—Dairy heifer.

The second year of club work includes the care, feeding and management of the yearling dairy heifer. Complete records must be kept. An exhibit should be made.

#### Third year—Dairy cow.

In the third year of dairy club work the club member has the responsibility of the care, feeding and management of the dairy heifer during her first lactation period, including the care of the young calf. Complete records must be kept on the project.

#### Fourth year—Production records on mature animals.

The fourth year of dairy club work includes the recording of the date of breeding and freshening and the keeping of feed and production records on mature producing animals belonging to the club member or on the home herd. It includes complete daily production records and monthly butterfat tests to determine annual milk and butterfat production.

### ORGANIZING THE DAIRY CLUB

A 4-H Club may be organized in any community in the State if some competent person will act as leader and adviser for the club. For best results each club should have at least five members carrying the same type of project. This gives them a common interest and more nearly assures the success of the organization. Although many club members start with purebred animals, oftentimes it is better for the younger club member to get his early training with a good quality grade calf. After gaining the necessary experience, he can then gradually work into the raising of purebred animals, if he so desires. Whether purebred or grade, an animal should be selected that the boy or girl will be proud to own. The consent and interest of the parents should be secured so that they will properly encourage the club member in his work. The calf should be the property of the club member and he should be responsible for the project, doing all of the work required in connection with the care and management of the animal. He must attend all meetings held by the club.

It is essential for best results that someone in the community, who is deeply interested in boys and girls and who will take an interest in the 4-H club organization, be selected as local leader. It is his duty to act as adviser to the club members, to help plan the programs, to be present at and guide the discussions at the club meetings, to visit the projects, to help the club members with their record-keeping problems, and to constantly encourage the members to do their best.

At the first meeting of the club a complete set of officers should be elected, consisting of President, Vice-president, Secretary, Treasurer, Yell Leader, Song Leader, and a Reporter. Definite meeting dates should be set and some discussion given to the more important activities which will be included in the year's program. Some time should be given to an explanation of the requirements of 4-H club work. The necessary literature should also be distributed at this time.

### THE CLUB PROGRAM

The club program for the year should be made up by the local leader, the county agricultural agent, and the club members. It will probably include, among other things, a tour of the club members' projects, an exhibit at some fair if possible, the training of judging or demonstration teams (or both) for county and state competition, representation at the State Club Week, and an Achievement Day at the completion of the year's work.

The following is a suggested order of business for club meetings:

#### Business Meeting.

- Roll call.
- Reading of minutes of previous meeting.
- Old or unfinished business.
- New business.
- Committee reports.
- Educational and instructional period.
- Social and recreational period.

A skeleton outline for the year's club meetings is given here. It is intended that this outline serve only as a guide in making out the year's program. It should be broadened considerably, and many of the subjects for discussion may be changed entirely.

#### First meeting—Organization meeting:

- Discuss 4-H club requirements.
- Distribute literature.
- Selection of officers and explanation of their duties.
- Selection of name for club and time and place of meeting.
- Plan program for the year.

#### Second meeting:

- Breeds of dairy cattle (discussion).
- Feeding the dairy calf (heifer or cow).
- Instruction in record-keeping.
- Parliamentary practice.

#### Third meeting:

- Care and management of the dairy calf (heifer or cow).

## Fourth meeting:

Judging dairy cattle (discussion).  
Discussion of demonstration teams.  
Check record books.

## Fifth meeting:

Tour of members' projects.  
Judging contest in connection with tour.

## Sixth meeting:

Dairy cattle diseases (Have one member report on tuberculosis in dairy cattle, another on abortion, etc., or have a talk on diseases by competent authority).  
Demonstration team trials.

## Seventh meeting:

Fitting calves for the show.  
Showmanship problems.

## Eighth meeting:

Achievement Day program.

Other interesting subjects to discuss at the club meetings would be:

1. Milk and butterfat testing.
2. Care of heifer before and after calving.
3. Pedigrees and their value.
4. Discussion of feeds.
5. Dehorning.
6. Outstanding dairy animals in the different breeds.
7. Marketing milk.
8. Minerals for dairy cattle.

Every club should hold an Achievement Day at the completion of the year's work at which time a program consisting of team demonstrations, reports, and other special numbers should be given. If possible, a club exhibit should be held on Achievement Day. The meeting should be open to the public and many times the Achievement Day can be developed into an annual community event. Specially designed 4-H club pins are presented on Achievement Day to those who have fulfilled all the requirements of 4-H club work.

## RECORDS

Record-keeping is an important phase of the 4-H project, and every dairy club member must keep a record on his stock. Records not only indicate the cost of raising a calf or the amount of money earned on the project, but in the case of mature animals can be used as a guide in feeding, in culling out poor producers, and in the selection of calves. Milk and butterfat production records are especially important. To show satisfactory profit, a

cow in Arizona should produce at least 250 to 300 pounds of butterfat per year.

An excellent method of keeping the feed record is to have a feed container which holds a one or two weeks' supply of grain. The grain should be weighed as the supply is put in and the weight recorded on the monthly record sheet. The grain should be weighed each time the feed container is filled. Roughage may be estimated by multiplying the daily amount fed by the number of days in the month.

Monthly feed and products record cards may be procured from the county agent's office for the livestock projects and these figures should be transferred to the livestock record book at the completion of the project. On the last page of this record book is a financial summary form to be filled out. Members are expected to keep records up to date.

## PRODUCTION RECORDS

The fourth year of dairy club work involves the keeping of production records on one or more dairy cows. Records may be kept on the home herd or on cows owned by the club member. A record is kept of the feed and of the milk and butterfat produced. From these figures may be determined the net income from each animal. Breeding and freshening dates should also be recorded. Complete records are kept on monthly production sheets which may be secured from the county agricultural agent.

The milk should be weighed after each milking and the amount recorded on the milk sheet. One day each month samples from the night and morning milkings should be tested for butterfat. Care must be used in taking these samples.

The samples taken should be proportionate to the amount of milk obtained from the cow. That is, if she gives twice as much milk at the night milking as in the morning, the night sample should be twice as large. The milk should be stirred thoroughly in order to get a composite sample of each milking. If it is not thoroughly mixed, inaccuracies will appear in the figures. The samples of milk taken may be tested at the creamery or by the dairy herd improvement association tester or possibly by the club member himself.

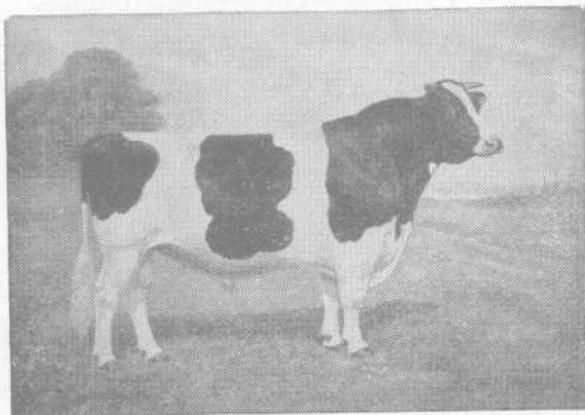
The butterfat produced during the month is easily computed by multiplying the fat percentage figure by the total milk production for the month. For example, if the cow produced 600 pounds of milk during the month, testing 5 per cent butterfat, multiply 600 by 5 per cent and the answer, 30, is the amount of butterfat in pounds produced during the month. At the end of the year the records will be summarized, feed cost computed and the net profit determined.

## BREEDS OF DAIRY CATTLE

Although the census figures for 1930 show 22,910,000 dairy cows in the United States, only approximately 1,000,000 are purebred. The five major dairy breeds are represented, namely: Ayrshire, Brown Swiss, Guernsey, Holstein-Friesian, and Jersey.

## HOLSTEIN-FRIESIAN

The Holstein-Friesian is one of the oldest dairy breeds in existence, having originated in the province of Friesland in Holland.



Courtesy Holstein-Friesian Association.

The true type Holstein bull.

Animals of this breed in this country are black and white in color and are the largest of the dairy breeds. They produce a large



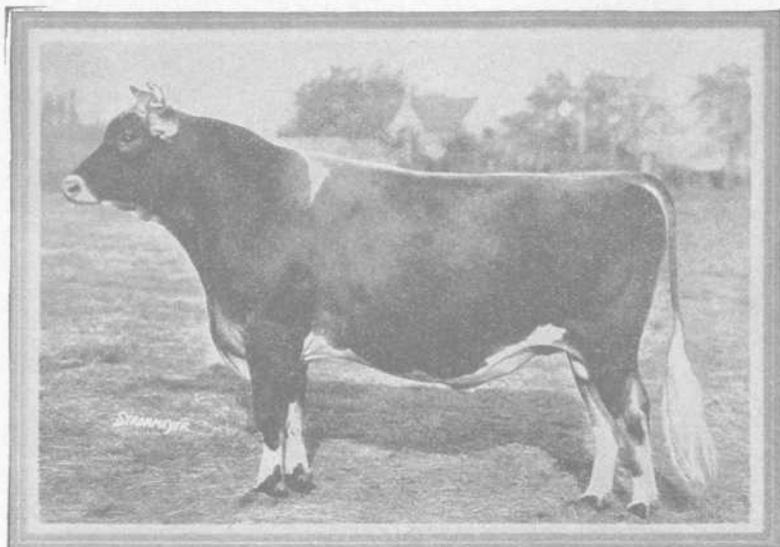
Courtesy Holstein-Friesian Association.

The true type Holstein cow.

quantity of milk, averaging about 3.5 per cent butterfat. Holsteins are adapted to the leveler land where feed is abundant. They do especially well in the cooler climates.

### JERSEY

The Jersey is often spoken of as one of the Channel Island breeds, having originated on the Island of Jersey in the English Channel. In color they vary from a light fawn to dark squirrel gray or black, the usual color being a fawn. Some individuals

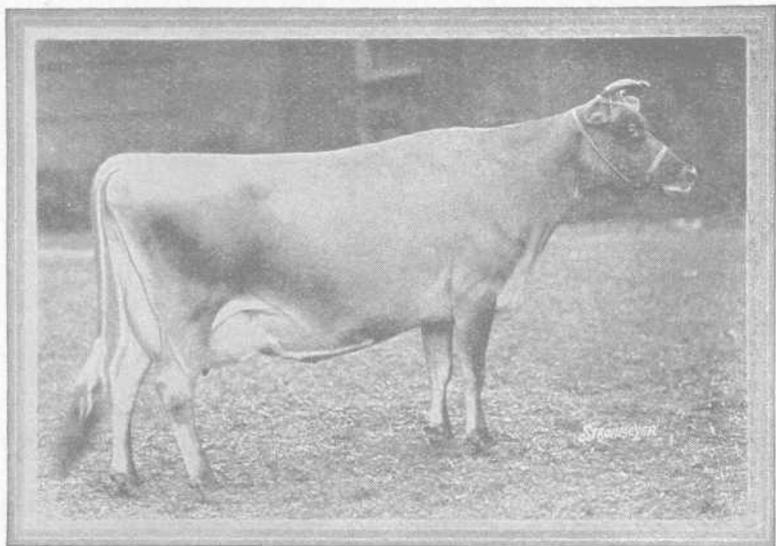


Courtesy American Jersey Cattle Club.

A desirable type of Jersey bull.

carry white spots. Jerseys are the smallest of the major dairy breeds but they are probably the most economical producers of butterfat. Their milk is yellow in color and carries an average of about 5.25 per cent fat.

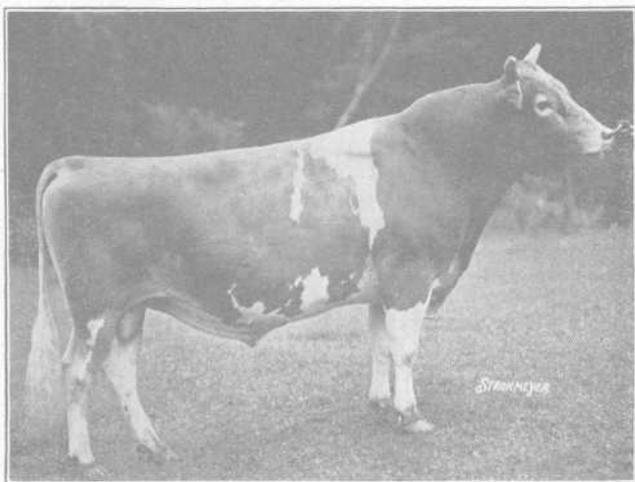
There are about 10,000 cattle on the Island of Jersey. There are no other breeds of cattle on the Island and none has been imported except for immediate slaughter since 1789. Island Jerseys are beautiful individuals with true dairy form and are somewhat smaller in size than the American type. Jerseys are adapted to warm climates and together with the Ayrshires are the best grazers of the dairy breeds.



Courtesy American Jersey Cattle Club.  
A desirable type of Jersey cow.

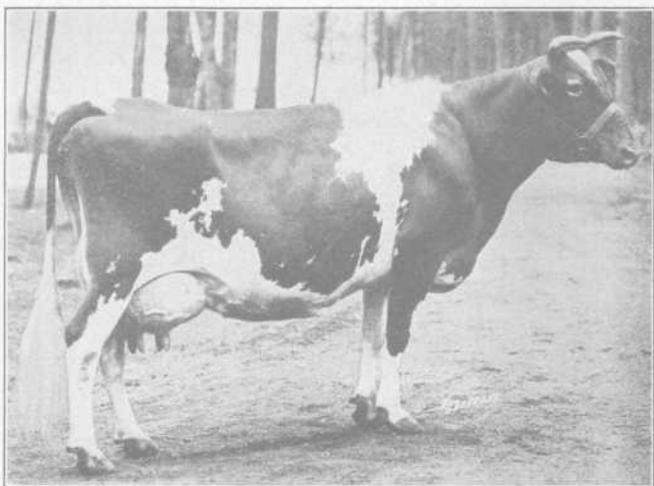
#### GUERNSEY

The Guernsey breed originated on another of the Channel Islands, where conditions are very similar to those on the Island of Jersey. Guernsey color is ordinarily reddish yellow with white markings. The skin is a deep yellow. The breed is larger boned than the Jersey but of good dairy conformation. Guernsey



Courtesy American Guernsey Cattle Club.  
A desirable type of Guernsey bull.

milk has a richer color than that of any other breed and due to this fact it has gained a wide popularity. Guernseys produce



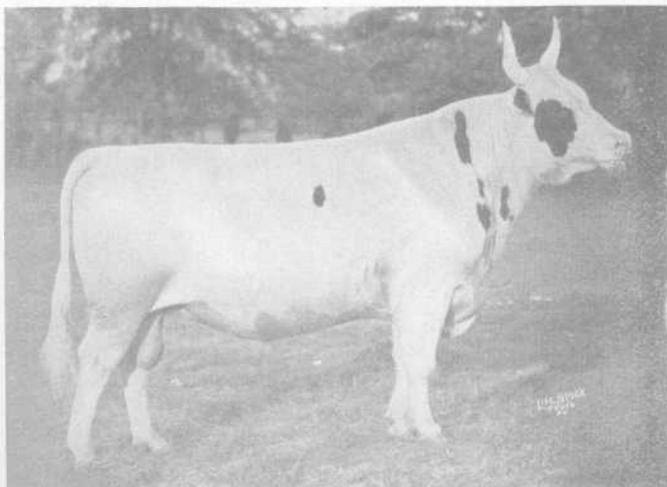
Courtesy American Guernsey Cattle Club.

A desirable type of Guernsey cow.

slightly more milk than Jerseys with an average butterfat test of approximately 5 per cent.

#### AYRSHIRE

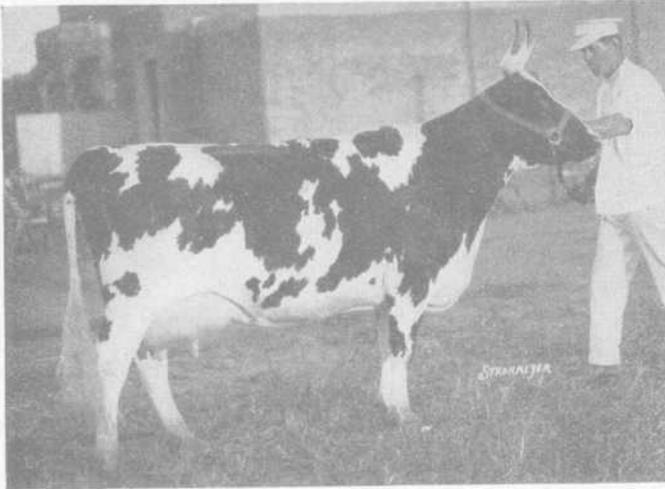
The Ayrshire originated in southwestern Scotland, a region rather favorable for dairy cattle. The breed is larger and heavier



Courtesy of the Ayrshire Breeders Association.

A desirable type of Ayrshire bull.

than the Jersey and their predominant color is red and white. Ayrshires are not as angular as other breeds, but are smoother throughout. The breed is characterized by its curving upright horns. Much attention has been given to udder development and they have the most perfect udders of any of the dairy breeds.



Courtesy of the Ayrshire Breeders Association.  
A desirable type of Ayrshire cow.

They are excellent grazers. They give good yields of milk, testing slightly under 4 per cent. The fat globules are small.

#### BROWN SWISS

The Brown Swiss originated in Switzerland and is probably one of the oldest dairy breeds in existence. They are large, somewhat fleshy animals and in Switzerland are classed as dual purpose cattle. The color varies from dark to light brown with a light grey stripe usually along the back. In some herds a mouse color is prevalent.

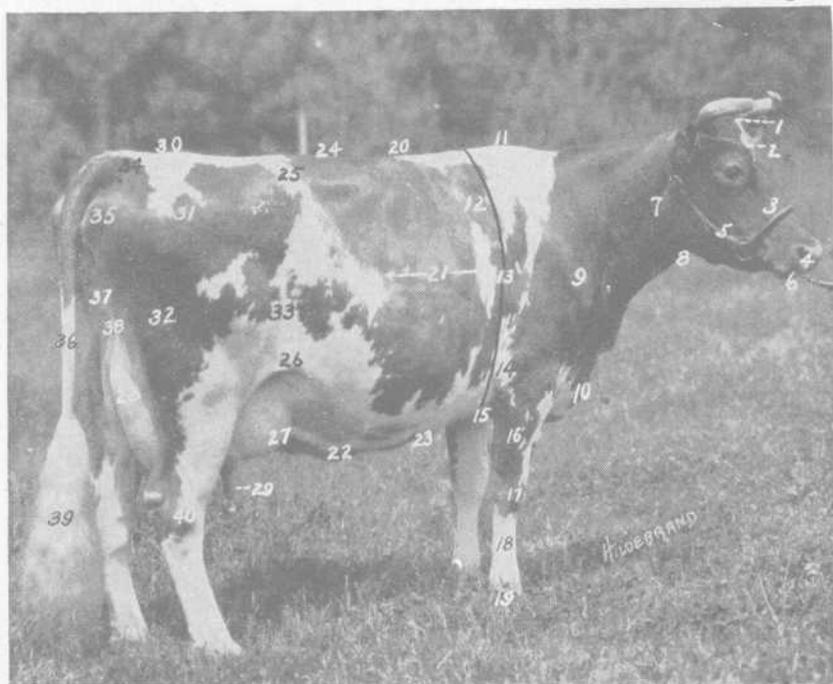
#### OTHER BREEDS

There are several minor breeds of dairy cattle, none of which has gained much popularity in this country. There are also several dual-purpose breeds of cattle.

#### SELECTION OF THE DAIRY CALF

One of the first questions, which will arise in the selection of the dairy calf, will be which breed to choose. There is no best breed of dairy cattle; there are excellent individuals in every breed. Market demands for milk products, prevailing breeds in the community, and personal preference should be considered

in selecting the breed. Some breeds are more adaptable than others to rough land or severe climate. Choosing a breed prevailing in the community offers a market for surplus stock as well as a greater opportunity to obtain the service of high quality bulls. If all breeds are well represented, more attention may be given to market demands and personal preferences.



The parts of a dairy cow:

- |             |                    |                      |                           |
|-------------|--------------------|----------------------|---------------------------|
| 1. Poll     | 11. Withers        | 21. Ribs             | 31. Thurl                 |
| 2. Forehead | 12. Crops          | 22. Milk veins       | 32. Thigh                 |
| 3. Face     | 13. Heart girth    | 23. Milk well        | 33. Stifle                |
| 4. Nostril  | 14. Elbow          | 24. Loin             | 34. Tail setting          |
| 5. Jaw      | 15. Floor of chest | 25. Hip or hook bone | 35. Pin bone              |
| 6. Muzzle   | 16. Forearm        | 26. Flank            | 36. Tail                  |
| 7. Neck     | 17. Knee           | 27. Fore udder       | 37. Escutcheon            |
| 8. Throat   | 18. Shank          | 28. Rear udder       | 38. Rear-udder attachment |
| 9. Shoulder | 19. Dew claw       | 29. Teat             | 39. Switch                |
| 10. Brisket | 20. Back           | 30. Rump             | 40. Hock                  |

Whether purebred or grade the animal chosen should be a typical individual. More pride will be taken in a good animal and if wisely chosen, there is less likelihood of later disappointment.

Buying calves locally affords an opportunity not only to look over the animal before the sale is made, but also permits the inspection of the entire herd—a fairly good index as to the probable

type of the mature individual. Great care must be taken that the purchase of calves outside the community be made from reputable dealers.

Ordinarily it is better to purchase calves, although heifers or cows may often be bought to advantage. The advantages of buying younger animals are a lower initial cost, greater ease of handling, and the opportunity of growing up with the animal. Too, there is less danger of introducing infectious diseases into the herd when calves are purchased. Disadvantages may be listed as a greater death risk, and greater difficulty in selection of good type individuals. The advantage in the purchase of the older animal lies primarily in the quicker return. Too, a bred heifer offers an opportunity for early herd increase as well as quicker milk production, although the initial outlay will be greater. Older club members often prefer to start their club-work with yearlings or bred heifers.

Care should be used to select a calf of good type as it is extremely discouraging to try to develop a poor individual. Not only should type be considered but the pedigree should be closely studied to see that it carries good blood lines. The production records of the calf's ancestors, and other close relatives, should be given a great deal of consideration in the selection of the calf.

Stock should be selected from herds free from tuberculosis, contagious abortion, and other diseases. The danger of contagious abortion is much less in calves under eight months of age. If older animals are purchased, they should be negative to the blood test previous to their purchase. Recently purchased disease-free animals should not be exposed to non-tested or diseased animals.

#### WHAT TO LOOK FOR

It is difficult to choose a calf with a full knowledge of her probable appearance as a mature individual. Allowing for the difference in age, the same general points are considered in judging calves as in judging mature animals.

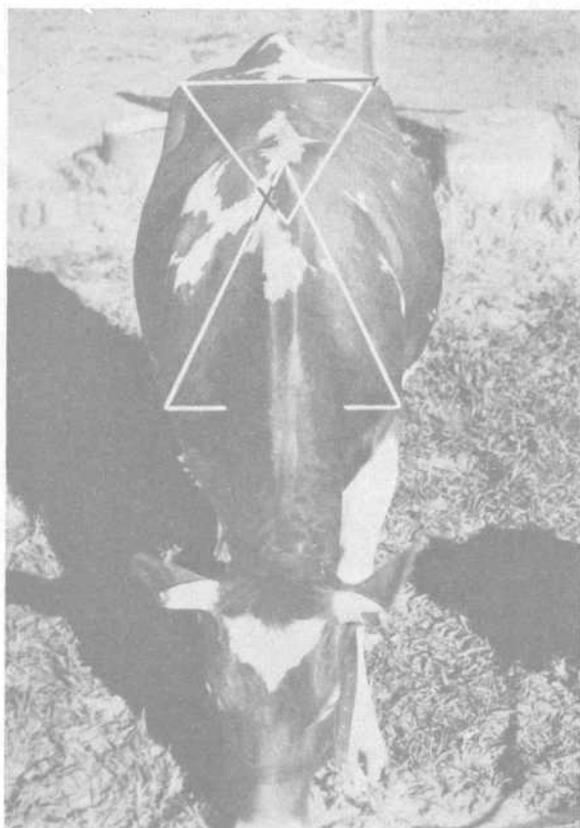
In selecting the calf certain points should be looked for. The head should be typical of the breed with prominent, alert eyes and with face slightly dished. The top line should be straight and strong with a strong loin. The rump should be long, wide and level. Teats should be squarely and evenly placed with good distance between the front and rear pair. Good constitution and quality should be apparent in the animal. The calf should also show the predominant breed characteristics.

#### SELECTION OF THE DAIRY COW

There are several principal factors which must be considered in the selection of dairy cows. These are: dairy temperament, mammary development, feeding capacity, constitution and breed type.

## DAIRY TEMPERAMENT

Dairy temperament is an indication of the ability to produce milk and butterfat from the feed eaten. The good dairy cow is angular and free from fleshiness or beefiness as compared to the beef cow. She is more refined throughout with a well-developed mammary system. Viewed from different angles, three well defined wedges or triangles appear. From the front may be seen a wedge whose point is at the withers and whose base lies along the floor of the chest. Good width at the point of the shoulders



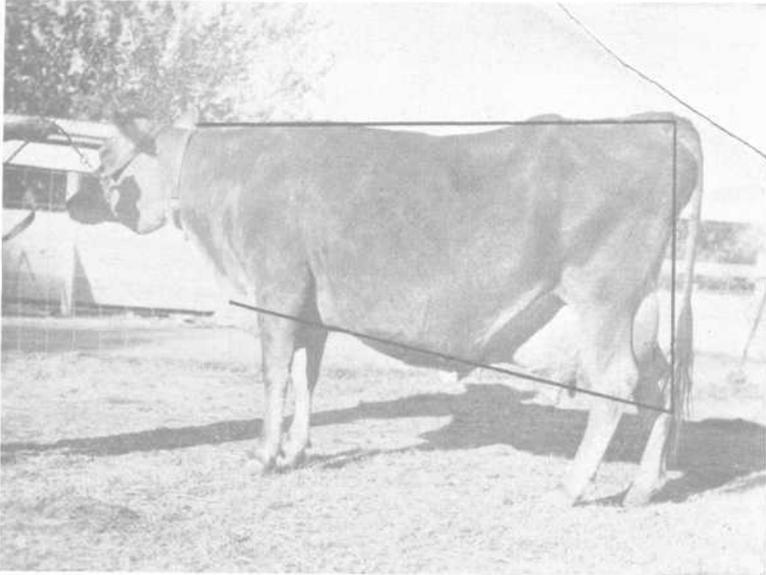
Top and front wedges.

The wedges of a dairy cow, showing thinness of withers, and width between the shoulder points and between the hips.

indicates good heart and lung capacity. Viewed from the top the point of the wedge is at the withers with the base extending from hip bone to hip bone. Thin withers indicate dairy temperament and a freedom from the fleshiness which is so undesirable in the dairy animal. Breadth between the hip bones indicates a frame

sufficiently large to support a good middle and a large udder. The third wedge is seen from the side. The top line of the cow forms one side of the wedge and a line drawn from the floor of the udder to the shoulder point forms the other side. In order to meet at a point, these two lines must extend beyond the cow's head. The base is a perpendicular line at the rear of the animal, joining the other two lines. The side wedge indicates good feeding capacity and udder development.

The head of the ideal dairy animal is clean cut and rather long



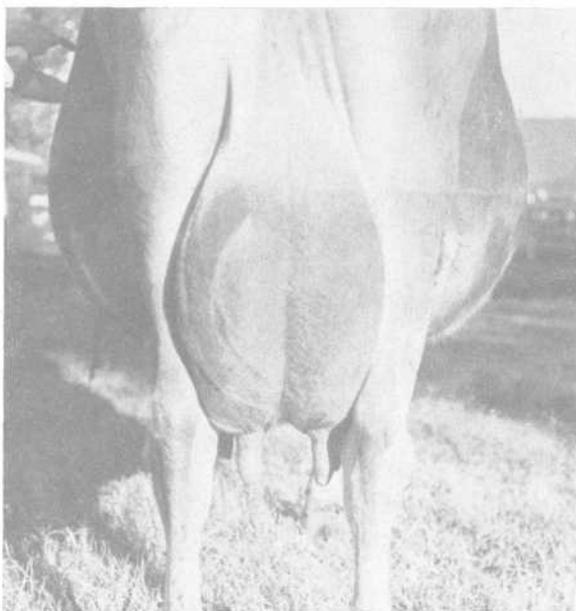
Side wedge.  
Characteristic side wedge of a good dairy cow.

compared to that of the beef animal. The face is slightly dished between the eyes which are large and prominent. The neck is long and slender and molded neatly into the shoulders. The withers are thin and prominent. Some fleshiness may appear during the dry period but this disappears soon after freshening. The back is straight and long, indicating good strength. The animal should have a strong loin attachment. The hips are wide with a long, wide and level rump. This type of rump indicates a frame to which a large udder may be attached. The ribs are well sprung, indicating capacity to handle feed.

#### MAMMARY SYSTEM

The mammary system includes the udder, teats, milk veins and milk wells. The ideal udder should be large, well balanced, soft and pliable—free from any meatiness. It should extend well

forward and have a high and wide rear attachment. The floor of the udder should be level with four well placed teats of uniform size and shape. The quarters should be full without cuts



A good rear udder. Note the size, also the height and extreme width of the attachment.

between the halves. The udder should not be pendulous. Milk veins should be long and tortuous. They carry the blood from the udder to the heart and if of good size indicate a large blood-carrying capacity. Milk veins pass into the abdomen through the milk wells, which should be large.

#### FEED CAPACITY

In order that a cow may be able to consume large quantities of feed she should have large feed capacity. The barrel or middle should be long, wide and deep with well sprung ribs. A strong, wide loin is generally associated with a large barrel. The animal should also have a strong jaw with a wide muzzle. Calves and heifers do not show such large middles, but if they have strong jaws and muzzle and a good loin attachment, it is assumed that they will develop good middles. It is especially desirable that cows have good size for their age. Recent studies have shown that other things being equal, the larger cows within the breed are the heavier producers.

### CONSTITUTION

Continued heavy milk production combined with the raising of a calf annually is a real strain on a cow. For this reason a cow must have a strong constitution in order to remain a profitable producer for several years. A large heart girth with well



A desirable udder, well attached.

sprung fore-ribs is a good indication of a large chest capacity with well developed lungs and heart. Large nostrils permit plenty of fresh air to be taken into the body. A broad head is an indication of a rugged body. A straight top line also indicates strength of body. Cows in good health generally have a soft and pliable hide.

### BREED TYPE

It must be remembered that although the same general dairy conformation is typical of all breeds, there are certain characteristics which distinguish the different breeds. Each breed has its own breed type which must be considered in selecting the animal.

### FEEDS

#### FEED CONSTITUENTS

Feeds are made up of a variety of constituents. These are classed as protein, carbohydrates, fat, mineral, and water. The protein of a feed is used for growth, replacing worn out tissues and for the protein of milk. Any surplus protein may be used as

a source of energy by the animal. Almost all of the body tissues, such as hide, hair, muscle, nerve, glands, and ligaments, are composed of protein compounds. The curd of milk is a protein substance. An abundance of protein is necessary, therefore, to supply the needs of the growing animal and of the cow in milk.

The carbohydrates are used by the animal body as a source of energy. They can be converted into fat in which form energy is stored in the body. They are also used to a large extent in the manufacture of the fat of milk.



An outstanding Holstein cow. Note the excellent capacity of barrel and udder.

The fats of feed, like the carbohydrates, are used by animals as a source of energy. Fats contain more energy per unit than any of the other nutrients. For this reason they are well adapted for the storage of reserve energy in the animal body.

Minerals are found in all common feeding stuffs and their functions in the animal body are numerous and varied. They furnish materials for the skeleton and so are very important to growing animals. They also help to maintain the osmotic pressure, the proper ionic concentration, and neutrality of the body. Certain minerals, especially iron, aid in respiration, while iodine is an essential ingredient of the thyroid gland. Other minerals aid in digestion and still others are useful in protein and carbohydrate metabolism. The more important minerals are calcium, phosphorus, sodium, potassium, iron, iodine, chlorine and sulphur.

Water is a very important constituent of both plants and animals. It dissolves the food constituents and acts as a carrier of the digested food and wastes of the body. The water content of the body of the average dairy animal is approximately 70 per cent.

### ROUGHAGES

Feeds are divided into two general classes—roughages and concentrates. By roughages are meant the more bulky feeds containing much fiber, such as hay, fodder, silage, and pasture. The dairy cow is noted for her ability to economically convert roughages grown on the farm into human food. The stomach, being divided into four parts, enables the cow to re-chew her food before sending it to the fourth compartment of the stomach where true digestion takes place. Roughages should make up the principal part of the ration for all dairy cattle after being weaned from milk. They serve to distend the barrel of the animal thus giving it more capacity. Good quality roughages conserve the health of animals by supplying vitamins, minerals and laxativeness to the ration.

Roughages may be divided into legume and non-legume or protein and non-protein roughages. All roughages contain some protein but the legume feeds contain a larger percentage than other common roughages. Alfalfa, clover, peas, and beans are legume roughages.

### LEGUME ROUGHAGES

Alfalfa is the most important roughage grown in Arizona. It furnishes a large amount of protein, is relished by all cattle, is laxative and has a relatively high content of calcium. Sweet clover is relatively high in protein, but is not as palatable as alfalfa. It is used mostly for pasture on fields where alfalfa does not do well. It does not make a very satisfactory hay. Cowpeas and soy beans are high in protein and make excellent hay, but are not grown to any extent in Arizona.

### NON-LEGUME ROUGHAGES

The non-legume roughages are relatively low in protein and should not be fed as the only roughage unless the grain ration is high in protein. The more important of these roughages are corn and sorghum silage. Silage furnishes a cheap source of feed but on account of its low protein content and large moisture content, it cannot be fed alone with good results. Usually cows are fed about 30 pounds of silage per day along with the other feeds. Oat hay is a good non-legume roughage. It is palatable and makes a good feed if fed with a little alfalfa or a protein-rich concentrate. Corn stover and straw are relatively poor feeds, being unpalatable, low in protein and minerals and rather con-

stipating. The root crops, such as mangels, make a good substitute for silage. They often contain as high as 90 per cent water so must be fed with more concentrated feed.

### PASTURES

Pasture is the ideal roughage for dairy cattle. On an irrigated farm in southern Arizona, it is possible to have succulent pasture throughout the year. For summer pasture, alfalfa is a favorite crop but Sudan grass is used quite extensively on account of its high yield and good feeding qualities. Sudan grass is quite palatable and does not cause animals to bloat. It is a warm weather crop and may be planted in the spring after danger of frost is past. There is less danger from bloat on alfalfa pasture if the cattle are turned on after it is in bloom.

For fall, winter and early spring pastures, barley, wheat and oats are used. Planting dates vary in different parts of the State. In the lower altitudes in the southern part of the State they should be planted in late August or early September to get a good yield in fall or winter. If planted in October or November, the pasture will be ready for late winter or early spring grazing.

### CONCENTRATES

Concentrates are the less bulky part of a ration and include grain and most mill by-products. They are fed mostly to supplement the roughages and to give a balanced ration. A cow cannot maintain a high production on roughages alone. Concentrates can never replace roughages entirely. Usually an animal does better if fed what it will consume of roughages and only sufficient concentrates to make up for any deficiency in nutrients.

### CARBONACEOUS CONCENTRATES

The principal carbonaceous (low-protein) concentrates used in Arizona are barley, oats, corn, sorghum grain, and dried beet pulp. The sorghum grain is not as palatable as the other feeds mentioned and should not be fed as the only concentrate. Beet pulp is usually too expensive to feed except as a substitute for silage and green feed.

### HIGH-PROTEIN CONCENTRATES

To provide additional protein in a ration, cottonseed meal, linseed meal, and wheat bran may be used. Linseed meal is too expensive to use except in getting cattle ready for show or in other special cases. Wheat bran is a favorite feed as it not only provides some protein but also is relatively rich in phosphorus. It has a good physiological effect on animals and is especially good for cows just before and after calving. It is used largely to lighten heavy grain rations. Cottonseed meal is the highest in protein of all the common dairy feeds and is usually the cheapest source of protein. It should be fed in grain mixtures when addi-

tional protein is needed. It should never be fed as the sole concentrate when alfalfa hay is the principal roughage as that combination of feeds provides too much protein. Like wheat bran, cottonseed meal is rich in phosphorus—an essential mineral.

#### COMMERCIAL FEEDS

There are for sale in every community feed mixtures put up by commercial firms. These ready-mixed feeds have some advantages and some disadvantages. They are usually desirable from the standpoint of variety of ingredients, lightness of the mixture, and palatability. The ready-mixed feeds may be bought in large or small quantities. They are usually higher in price than unmixed feeds and one cannot be sure that the ready-mixed feeds are not adulterated with worthless materials such as finely ground hulls. If one buys from a reliable firm, this latter objection should be overcome to a large extent.

#### CHARACTERISTICS OF A GOOD RATION

1. Correct amount of feed.
2. Correct relative amounts of protein, carbohydrate and fat.
3. Palatability.
4. Succulence.
5. Bulk or lightness.
6. Variety.
7. Laxativeness.
8. Effect on health of animals.
9. Economy or cheapness.
10. Mineral content.
11. Vitamin content.

The correct amount of feed is determined by the size of the animal, and whether it is growing or producing milk. A certain amount of the feed is used for maintenance, that is, in keeping up the life processes and maintaining the heat and energy of the body. The maintenance requirement of an animal is in direct proportion to its size. If normal growth or production is to occur, the amount of feed must be above maintenance requirements. It is usually most economical to give an animal an amount of feed sufficient to maintain maximum growth or production without fattening the body.

Correct relative amounts of proteins, carbohydrates and fats must be given in order to maintain the health and vigor of the animal. Growing animals and cows with calf require a ration higher in protein than do mature animals.

A feed is said to be palatable if the cattle like it. Animals do better on palatable feeds due probably to an increased consumption and greater digestibility.

A succulent feed is one that contains the natural juices of the green forage. Both cows and calves do better on succulent feed than on dry feed.

By bulk or lightness of ration is meant a feed light in weight in proportion to volume. A light ration is more porous and is thought to be more easily acted upon by the digestive fluids of the body. Cows eating heavy rations are more subject to digestive disorders. Wheat bran, crushed oats, and dried beet pulp are feeds commonly used to lighten a grain ration.

A variety of feeds for a dairy cow overcomes any deficiency in a particular feed. The animal body requires certain definite compounds in the feed; not all feeds have all the constituents required and those present in a particular feed are not always in the proportions suited to the animal's needs. Feeding a variety of feeds tends to bring about a proper balance of nutrients, minerals, and vitamins. It is advised that the ration of an ordinary cow should contain not less than three concentrates that come from different sources, in addition to roughage. Extra high producers are often fed a ration containing five to eight grains.

Laxative feeds promote the health and well-being of dairy animals and should be fed as a part of the ration. Silage, legume hay, roots, green feed, wheat bran and linseed meal are examples of laxative feeds.

Minerals and vitamins in the feeds of dairy cattle are not a serious problem in Arizona. Well-cured alfalfa hay and green alfalfa contain goodly amounts of calcium and Vitamin A. All the fresh pasture crops contain sufficient Vitamin A. Cattle apparently are not dependent on feed for Vitamins B and C. There is no evidence of a deficiency of Vitamin D in rations usually fed to dairy cattle in this State.

## FEEDING, CARE, AND MANAGEMENT OF THE DAIRY CALF

The calf should be born in a clean place—in a pasture, a clean corral or a well-bedded stall. Cleanliness at this time is very important as the new calf can become infected with certain diseases through the navel cord. White scours is contracted frequently in this manner. The navel cord of the new-born calf should be painted with tincture of iodine or treated with some other disinfectant solution.

### TEACHING THE CALF TO DRINK

It is the usual practice to leave the calf with its mother two or three days, then remove it and teach it to drink from a pail. Some dairymen prefer to take the calf from its mother immediately after birth. In any case it should have the first milk (colostrum) which is laxative and which gives the calf certain materials which help it to resist disease during the early part of its life.

The sooner the calf is taken from its mother, the easier it is taught to drink. It may be necessary to starve it for twelve to twenty-four hours or until it is very hungry. An easy way to teach it to drink is for the attendant to back the calf into a corner

and straddle it so it can be held in place. Two fingers should be placed in its mouth and as it sucks the fingers its nose should be forced down into the milk. As it begins drawing the milk into its mouth, the fingers can be gradually withdrawn. It may be necessary to repeat this process several times but eventually patience will be rewarded and the calf will drink without persuasion.

#### AMOUNT OF MILK TO FEED

The amount of milk a calf needs depends on its size and age. The first few days after birth, a calf needs only 6 to 8 pounds while a large calf can easily consume 10 to 12 pounds of milk daily. A calf should not have all the milk it wants, as it will gorge itself and get indigestion. It is better to keep the calf a little hungry than to overfeed it. More calves are harmed by over-feeding than by under-feeding. As the calf grows, the quantity of milk can gradually be increased until at one month of age it is taking 10 to 14 pounds of milk daily, depending on its size and health. A calf at any age does not need more than 16 to 18 pounds of milk.

#### FREQUENCY AND REGULARITY OF FEEDING

It is the usual practice to feed calves only twice a day. Young calves do better if the milk is divided into three feedings so that they are not fed so much at one time. This extra feeding takes more time and unless one can have the milk at the same temperature and of the same quality as at the other two feedings, the third or extra feeding should be omitted. The feedings should be at the same time each day and the intervals between feedings should be equal.

#### QUALITY OF MILK

The temperature of the milk fed should always be about the same. The milk should be sweet. For the first four days, the calf should have its mother's milk but after that the source of the milk is not so important. The milk should be warm, about 90° to 100° F., and not too rich.

The calf should be fed whole milk for the first two weeks. After that skim milk can gradually replace the whole milk at about the rate of one pound per day until skim milk only is being fed. It is a mistake to increase the total quantity too much as the change is made to skim milk. Some feeders think a calf should have more skim milk because it is not as rich as whole milk, but there is danger of causing indigestion by overfeeding. If at any time the milk is not up to standard, that is, if it becomes sour or dirty or cannot be warmed before feeding, the quantity fed should be reduced. Calves will thrive on sour milk if it is clean and not too old and is fed regularly. Changing from sweet milk to sour milk is likely to cause difficulties.

## FEED INDIVIDUALLY

Each young calf should be fed separately so the owner can be sure how much feed it is receiving. Separate stalls or pens are desirable for this purpose, but if several calves must be kept together, they can be fastened in stanchions or tied with ropes while being fed. Keeping them fastened for an hour or two after feeding will prevent to some extent the bad habit of sucking ears or udders.

## SANITATION

Clean pails and pens for calves are a first essential. The calf pails should be washed after each feeding. All filth should be removed from calf pens regularly. Calves are very sensitive to and frequently contract disease from dirty pails or pens.

## FEEDING GRAIN TO CALVES

The calf will begin to eat a little grain at about two weeks of age. This should be encouraged while the calf is being changed over to skim milk as the fat and starch of the grain will substitute satisfactorily for the fat of the whole milk. At first the calf will take not more than a handful, but at one month old it should be eating one-half pound of grain daily. At three months of age the calf can be fed 2 to 3 pounds of grain per day, depending on the breed and size. Unless one desires to force the growth of calves, one pound of grain per day up to six months is sufficient. The grain should be fed in a box just after drinking the milk. It should be given only what it will consume at each feeding.

The calf gets plenty of protein in the milk and alfalfa hay. The grains fed should be high in starch content like barley, oats, Hegari, and beet pulp. Wheat bran is usually fed since it is relished by calves and induces them to eat the other grains.

The following grain mixtures are satisfactory:

- (1) Three parts cracked corn and one part wheat bran.
- (2) Three parts rolled barley, one part wheat bran, one part ground oats.
- (3) Four parts cracked corn or rolled barley, three parts mill-run wheat bran, one part linseed meal.
- (4) Equal parts of cornmeal and crushed oats.
- (5) Two parts rolled barley, two parts wheat bran, one part whole oats, one part dried beet pulp.

Hegari or any of the other grain sorghums may be substituted, if ground, for corn or rolled barley, but on account of the lack of palatability should not compose more than half of the grain mixture. Grain need not be finely ground for calves; in fact, if not too hard, they usually prefer it coarsely ground or whole.

### ROUGHAGE FOR CALVES

Alfalfa hay is the best dry roughage for calves as it contains protein needed for growth and also has a relatively large amount of calcium which is needed for bone development. If alfalfa is not available any other roughage of good quality will do.

The calf will begin to nibble hay after two weeks of age and should be given about a handful per day at first. After it starts eating hay well, it should be given all it will consume each day. Sometimes a calf will eat too much leafy alfalfa hay and scouring will occur. In that case, the amount of hay should be limited until the calf is older. It is well to give the calf fresh hay each day rather than to fill the manger. The hay becomes unpalatable if left in the manger several days.

Some sort of manger or feed rack should be provided so that the hay can be kept clean. Hay that is soiled by being trampled under foot may easily be a source of infection. The rack should be emptied each day and fresh roughage supplied.

Great care should be used in feeding silage to calves as it spoils easily. Unless it can be kept fresh and of good quality until all of it is consumed, it had better not be fed to calves under six months old.

### PASTURE FOR CALVES

Calves under two months old will not eat much pasture. After that age, pasture can replace all roughage if it is of good quality. Fresh green roughage supplies the calf with Vitamin A and other health-giving factors. Pasture is considered the best of all roughages.

### THE CALF PEN

For the first month or two, the calf should be kept in a pen by itself. A small pen, about 5 by 8 feet, is sufficient. Keeping a calf by itself enables the feeder to observe it more closely and to detect any abnormal condition such as a digestive disorder. Calf ailments are easier to control if detected in the early stages. If separate pens for the young calves cannot be provided, the next best arrangement is to have the pen equipped with stanchions so that the calves can be fastened while eating. This insures each calf getting its share. If there are only a small number of calves, they may be tied with halters.

### FEEDING, CARE AND MANAGEMENT OF THE DAIRY HEIFER

After weaning from milk, the dairy heifer should be given sufficient feed to make a good growth, but not enough to fatten. The heifer must develop sufficient size before freshening as during the milking periods growth is greatly retarded. If pasture is available, it makes the best possible feed for the growing heifer. In the absence of pasture, alfalfa hay makes the best roughage

and should be supplied fresh each day in liberal amounts. If the heifer is somewhat thin, grain feeding may be necessary. One-half to one pound of grain to each 100 pounds of live weight should be sufficient. The amount of grain to feed would depend on the condition of the heifer and the quality and amount of roughage provided.

If a heifer is seriously underfed, she will not develop a correctly proportioned body and will be too small at maturity. On the other hand, it is a common belief among dairymen that heifers kept too fat during the growing period are often shy breeders and develop into low producers. It is well to pursue a middle course and keep the heifers in good growing condition, neither too thin nor too fat.

#### AGE TO BREED

The proper age to breed a heifer depends somewhat on the breed and on the development of the animal. Heifers that are undersized should be given time to make up their growth before breeding. On the other hand if the heifer is well advanced, she can be bred earlier than is considered normal.

Holstein heifers are usually bred at nineteen to twenty-one months of age, Jerseys at fifteen to seventeen months, Guernseys at seventeen to nineteen months, and Ayrshires at eighteen to twenty months.

A heifer will usually freshen from two hundred seventy-five to two hundred eighty-five days after she is bred. The time the calf is carried by the mother is called the gestation period. During gestation the heifer is not only nourishing her own body but she is nourishing the growing unborn calf. She should be well fed during this period. It is advisable to have the heifer in good condition when she freshens. She will milk the fat off the body in a short time if she has inherited desirable dairy characteristics and temperament. A good grain mixture for the pregnant heifer would be equal parts of rolled barley, ground oats, and wheat bran. Plenty of good quality alfalfa hay should be supplied if pasture is not available.

About two weeks before the calf is expected all grain feeding should be discontinued except wheat bran. A little dried beet pulp added to the bran will aid in keeping the bowels laxative. If the heifer is on pasture, other feeds are not necessary.

It is advisable to remove a heifer from the rest of the herd before calving and place her in a pasture or clean pen. As stated before, it is of utmost importance to have the calf born in a clean place.

#### CARE AT CALVING TIME

During the time of calving, the heifer should be left strictly alone unless she is having trouble. In most cases no assistance is needed and both the heifer and calf will do better if no one

interferes. In case of difficult calving someone who has had considerable experience should be called. Sometimes the services of a veterinarian are required.

### FEEDING THE HEIFER IN MILK

If the heifer has been fed correctly before calving, she will be in good condition at freshening. This surplus flesh will enable the heifer to produce milk for several days on a minimum amount of feed. It takes a cow two to three weeks to recover entirely from the effects of calving. She should not be fed a full ration for that length of time.

For the first few days after calving, the heifer should be fed lightly on feeds that are laxative in nature and not too heavy. A bran mash made of wheat bran and hot water makes an excellent feed for the first day or two. Leafy alfalfa hay should be provided for roughage. After the first few days the grain ration may be increased gradually in quantity and richness until a full ration is reached at two weeks to a month after calving. A cow is expected to lose weight for the first month or two, drawing on the reserve flesh. Usually it is best to follow increased production with increased feed rather than to try to force production in the fresh cow with increased feed. The grain ration should be increased not more than one-half pound per day until the heifer reaches the maximum production of milk.

### RULES FOR FEEDING

Grain should be fed in proportion to the milk produced. The ratio of grain to milk varies under different conditions, but usually a Jersey or Guernsey cow should have one pound of grain to about 4 pounds of milk and a Holstein or Ayrshire one pound of grain to 5 or 6 pounds of milk. If the quality of the roughage fed is low or the cow is too thin in flesh, the proportion of grain should be increased. On the other hand, if the animal is getting an unusual amount of nutrients in the roughage or if she is inclined to fatten, the proportion of grain to milk should be decreased. It is advised that a cow in milk be given all the roughage she will consume each day. If fed in the dry lot, the amount of hay should never be less than one pound per day to each 100 pounds of live weight.

It is important to keep the heifer up to full production continuously. If she decreases in amount of milk given due to improper feed or care, it is practically impossible to get her back again. An increase in milk production by a cow several months along in lactation is usually at the expense of too great an amount of feed. Animals should be watched carefully and fed sufficiently to keep up production without waste. The cow should be kept in good thrifty condition but not fat.

The average cow fed a balanced ration uses approximately one-half of her feed for milk production. The remainder is used for body maintenance, as well as for growth in the immature animal and nourishment of the unborn calf in the pregnant animal.

That portion of the feed, which is used for body maintenance, is the first requirement of the animal and is practically the same whether the cow is in full production or is not producing any milk. Figure 1 indicates the use to which a cow puts her feed. When a heavy producing cow is fed a full ration, all feed above

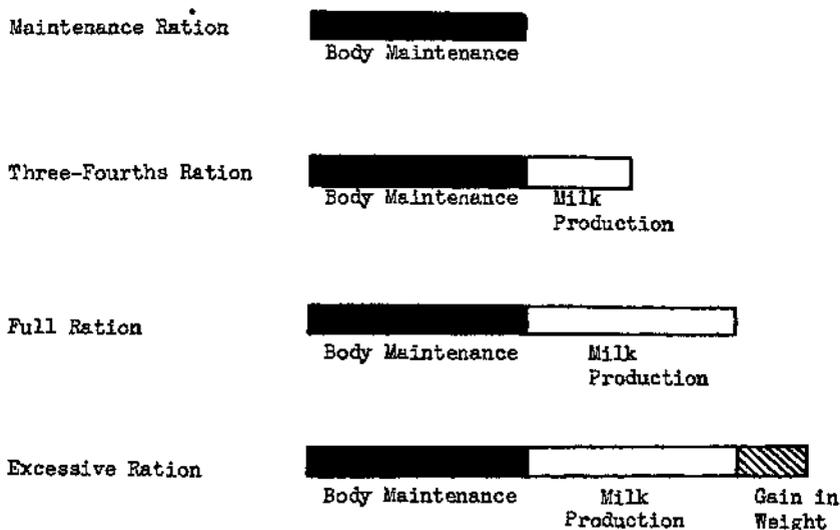


Fig. 1.—How a dairy cow uses her feed.

that used for maintenance, growth, or fetal development is used for milk production. If the ration is reduced one-fourth, the cow must of necessity cut down the production of milk as the amount of feed needed for maintenance is essentially the same. Theoretically, she now has only one-half as much feed available for milk production as she had in the full ration and if reduced again until she is getting only a one-half ration, she will have no feed available for milk production. As a matter of fact, however, if a dairy cow's ration is reduced to one-half, she will not immediately cease to produce milk. She will draw on her body reserve in order to continue for some time to produce milk. On the other hand if an excessive ration is fed, she will, as the chart indicates, use the excess feed to put on additional weight.

## GRAIN MIXTURES

In compounding grain mixtures, one should give consideration to the market price of the ingredients. Usually, grains grown locally are cheapest but they may require the addition of shipped in concentrates to give variety and palatability.

The following mixtures are known to give good results if fed with alfalfa hay and silage:

- |     |                 |         |
|-----|-----------------|---------|
| (1) | Cornmeal        | 5 parts |
|     | Rolled barley   | 5 "     |
|     | Wheat bran      | 5 "     |
|     | Ground oats     | 5 "     |
|     | Cottonseed meal | 3 "     |
|     | Linseed meal    | 1 "     |
| (2) | Wheat bran      | 2 parts |
|     | Crushed oats    | 2 "     |
|     | Dried beet pulp | 2 "     |
|     | Cottonseed meal | 2 "     |
|     | Corn            | 1 "     |
|     | Rolled barley   | 1 "     |
| (3) | Wheat bran      | 4 parts |
|     | Cornmeal        | 3 "     |
|     | Oats            | 3 "     |
|     | Cottonseed meal | 2 "     |

If no silage is fed and the roughage is alfalfa hay or pasture, less protein is needed in the grain mixture.

The following will give good results:

- |     |                 |         |
|-----|-----------------|---------|
| (1) | Rolled barley   | 3 parts |
|     | Wheat bran      | 3 "     |
|     | Crushed oats    | 2 "     |
|     | Cottonseed meal | 1 "     |
| (2) | Wheat bran      | 2 parts |
|     | Dried beet pulp | 2 "     |
|     | Ground Hegari   | 2 "     |
|     | Rolled barley   | 1 "     |
|     | Cottonseed meal | 1 "     |

## COMMON DISEASES OF DAIRY ANIMALS

The dairy club member should be able to recognize some of the minor diseases affecting cattle. In serious cases, however, it is always advisable to employ a trained veterinarian. Treatment by unskilled caretakers is often worse than no treatment at all.

## TUBERCULOSIS

Tuberculosis in cattle is a very serious disease on account of the danger of its transmission to those consuming the milk. It

is readily transmitted to other cattle associating with an infected animal. All dairy cows should be tested regularly once each year by a qualified veterinarian.

#### ABORTION

Abortions of premature calves may be caused by mechanical injury, deficiency in the feed, drugs, ergot, or infection. When several cases occur within a short time, they are usually caused by infection by the abortion organism.

Infectious abortion causes more financial loss to dairymen than any other disease. Generally it causes the fetus to be expelled between the fifth and seventh month of pregnancy. After one abortion, the animal develops a natural immunity and may not abort again though she may carry and spread the disease. The disease may be detected by the blood test. If one is buying animals to be put in a clean herd, he should have them tested before the purchase is made.

All aborting cows should be isolated and not returned to the herd until all discharges have ceased. The aborted fetus and membranes should be burned or buried and the place where the abortion occurred should be disinfected by wetting thoroughly with a 5 per cent solution of carbolic acid or other coal-tar disinfectant.

#### GARGET

Inflammation of the udder is common. If the difficulty is merely caked udder caused by injury, chilling, or congestion, it may be relieved by bathing the udder with hot water for twenty minutes three times a day. After bathing, the udder should be wiped dry and an ointment applied.

When the udder becomes infected by bacteria, the situation is more serious. This form of garget may be infectious and spread through the herd. The symptoms may be mild and chronic or severe and acute. In the mild form the only evidence of the disease may be merely minute clots of milk in the first streams of milk. In the severe form, however, there may be acute inflammation of one or more quarters of the udder. The milk may be clotted at first followed in a few days by a watery condition of the milk. In the advanced stages a foul smelling yellow or reddish fluid may be drawn from the udder accompanied by particles of pus.

Treatment of infectious garget must be prompt and thorough. The infected cows must be milked last. The hands and utensils must be washed and disinfected immediately after milking. The infected milk should be disinfected before being thrown away. Hot water applications should be used on the udder, but these are insufficient to effect a cure. Bacterins often give relief if they do not effect a cure. Some dairymen have had excellent results from the use of a bacterin made by a laboratory from the

infected milk. If the disease reaches the acute stage, one or more quarters of the udder are often permanently impaired. It is inadvisable for the dairyman to try to treat the interior of the udder by injections of any kind. That sort of treatment should be administered only by a qualified veterinarian.

### CALF SCOURS

Indigestion is one of the most common causes of scours. Precautions to be taken to prevent scours were discussed under "Care and Feeding of the Calf."

As soon as a calf shows symptoms of illness it should be isolated from the other calves and the pen should be cleaned and disinfected. The quantity of milk fed should be cut in half. A dose of castor oil (two to four tablespoonfuls, depending on the size of the calf) should be given. After the castor oil has acted, a teaspoonful of a mixture of one part salol and two parts bismuth subnitrate may be fed in the milk twice daily. If the scours does not stop at once, two or three raw eggs given in the place of the milk for several feedings may give good results.

Mild cases of scours may be remedied by making a saturated solution of lime water and adding two ounces of the clear liquid to each pint of milk fed. In severe cases of calf scours, especially if the affected calf is a valuable animal, the services of a competent veterinarian may be required.

White scours is a form of indigestion occurring when the calf is one to four days old. The dung is whitish in color and very foul smelling. The calf is depressed and wants to lie down most of the time. The disease is quickly fatal in most cases and treatment is usually of no avail. Prevention should be practiced in all dairies. As stated previously, this consists of strict sanitation, and having the calf born in a clean place, either in a pasture, clean corral or well-bedded stall. Filth getting into the calf's mouth or on its navel cord is considered the cause of this disease. If this disease becomes established on a farm, it is very difficult to get rid of the infection.

### FITTING FOR THE SHOW

Although it is not expected that young boys and girls should become expert showmen, it is extremely good training for them to fit and show an animal. The show-ring offers an excellent opportunity to study breed type and by watching expert judges the club member may become a better judge of dairy cattle.

One must start early in order to fit properly an animal for the show-ring. Although proper fitting may do much for the appearance of a calf, some animals should never be fitted. It is almost an impossibility to correct a droopy rump, a low back or a plain individual. Minor defects may often be remedied through proper fitting.

### FEEDING

Feeding should receive the first consideration. If the animal has been properly fed previous to the fitting period, the feeding problem will be much simpler. For show purposes an animal should not be too fat but should have a sleek, thrifty appearance. Barley, linseed meal, alfalfa, silage or pasture tend to produce a soft pliable skin and silky hair and together with blanketing and a daily brushing will produce an excellent coat. A good grain ration to feed the last month or six weeks is three parts rolled barley, three parts wheat bran, three parts ground Hegari, three parts beet pulp, and one part linseed meal. Alfalfa hay is an excellent roughage for the show heifer. Should digestive disturbances arise, the ration should be reduced temporarily. In addition to balancing the ration, the feeding of hay develops a good middle in the dairy animal.

### TRAINING

Proper training is a very essential part of the fitting program and demands a great deal of patience on the part of the trainer. The animal should be handled frequently to accustom it to the owner, a few minutes training each day being of great value. First it should be taught to lead and to stop at the will of the showman. It should be taught to stand squarely on its feet with head erect and back straight and to move its legs or feet when they are touched by the showman's foot or knee. The front feet should be side by side with one hind foot slightly to the rear of the other. Study the animal in order to learn the position in which it shows to best advantage. Proper posing of the animal aids in bringing out its good points.

### CLEANING AND CLIPPING

It is a good idea to wash the prospective show animal at the beginning of the fitting period. Select a warm day and use lukewarm water. Tar soap is excellent (Ivory soap may also be used). After working up a heavy lather, rinse thoroughly as any soap remaining on the calf may make the hair feel harsh. Animals should be blanketed after the rinsing. Animals should not be washed too often as this removes the natural oil from the skin leaving it harsh and dry. Probably once every week or two is sufficient, depending on conditions. It may be necessary to wash white animals more often. Blueing added to the water will aid greatly in making the hair whiter.

Usually only the head, the top of the neck and the tail of calves and heifers need to be clipped. This is best done ten days before the show as it takes about that long for the hair to grow sufficiently to present a neat appearance. Care should be taken in clipping the tail that the switch is left untrimmed and that the trimmed part at the tail blends neatly into the untrimmed por-

tion. In the case of cows, the udder and belly are both clipped to show the veining. If the coat of hair is long and rough, it is well to clip the entire body of the calf four to six weeks previous to showing. The head and tail may then be reclipped the day previous to the show.

The show animal should be housed in clean, comfortable quarters during the fitting period, thus offering protection from the hot sun and the flies. The barn may be darkened during the day and the animal turned out at night. About a month previous to the show, blanketing should be started. This protects cattle from flies, smooths the hair and mellows the hide. The blankets may be made from burlap bags or from ordinary blankets.

Brushing daily during the fitting period with a soft brush glosses the hair, and makes the hide pliable; curry combs are too severe. Rubbing the hide vigorously with the lay of the hair adds to the quality of the hair and hide.

#### HORNS AND HOOFS

A well-balanced set of horns adds much to the beauty of appearance of the animal. This should be taken advantage of in the show-ring and the horns properly polished. It may be necessary to use horn trainers or weights early in the life of the calf to straighten out the horns. If they must be shaped, they may be trimmed rather thin on the side toward which they will be bent. Care must be taken, however, as the horns of young calves are rather soft and are easily turned. After rasping down the roughest places, the horns may be smoothed with a steel scraper or a piece of glass. This is followed by the use of a piece of sandpaper or emery cloth. Steel wool is excellent to put on the finishing touches. Care must be used as too much filing and scraping may weaken the horn, causing the shell to be easily knocked off. The final polish may be put on by using a silver or metal polish. Powdered pumice stone or powdered tripoli mixed with sweet oil to form a paste is often used to give a hard polish. The paste should be rubbed on with the finger and polished with a strip of woolen cloth. This final polish should be put on at the show before the judging.

Show animals should stand easily and squarely on their feet and if the hoofs have grown in such a way that this is impossible, they should be trimmed. They should not be trimmed too closely as temporary lameness may result. For this reason, trimming should be completed some little time before the fair to insure full recovery from any after-effects. The hoofs may be polished in the same manner as the horns.

#### AT THE FAIR

For the safety of all concerned, there are certain rules which should be followed at the fair. For watering use the calf's or

heifer's own water bucket. Feed should be kept in a clean place and free from contact with people passing through the barn.

Equipment needed at the fair will probably include water and feed buckets, blankets, show halter, clippers, soap, sweet oil, sandpaper or emery cloth, brush, and a pitch fork. Stalls should always be kept neat and attractive and well bedded. Feeds should not be changed as animals are sometimes easily upset at this time.

### SHOWING

There are a few final preparations which must be made previous to showing. The day before the show the switch should be washed thoroughly and braided into three tight braids. The animal should be washed again, if necessary, and should be well bedded. Sufficient time should be allowed before the judging on show day to put on the final touches. The calf must be clean, well brushed and the final polish must be put on the horns. Just before the judging, the switch should be combed out and brushed.

All dust may be removed and a lustre and gloss given to the hair by going over the animal with a flannel cloth dampened with a mixture of sweet oil, alcohol, and tincture of green soap. The animal should be given water just before being led into the ring although care should be used that she does not drink too much as it will give her a bloaty appearance. Oftentimes show animals are not given all the water they will drink the night before the show in order that they may take the proper fill the next day.

In the ring the showman should always be on the alert to show his animal to best advantage. When leading the animal, he should walk on the left side, his right hand grasping the lead rope close to the halter. Proper showing is essential for best results.

### JUDGING DAIRY CATTLE

In order to be able to raise or purchase dairy cattle intelligently, one should be a good judge. One, who has some native ability and who will put continued study on it, may become in time a very good judge of animals. Advantage should be taken of every opportunity to watch judges place rings of animals and to enter judging contests. Ability to detect quickly strong and weak features of different animals and to give a strong set of comparative reasons is very valuable in livestock judging. One should have a knowledge of the characteristics of each breed and should have a mental picture of the ideal animal.

Four animals usually constitute a ring for judging purposes, the animals being called A, B, C, and D, or 1, 2, 3, and 4. Contestants should first see the animals in motion, viewing them from a distance and noting their general appearance. They should then view them from both the front and rear as they stand side by side. Lastly, the animals should be lined up one behind the other for the side view.

## ORAL REASONS IN JUDGING CONTESTS

In giving oral reasons on a ring of livestock, certain points must be kept in mind. Reasons must first of all be accurate. Other requisites are that they be brief, yet complete enough to bring out the important points.

Comparative terms should be used in telling wherein one animal is superior to another. Major differences should receive the greatest attention in the giving of reasons with very little time taken for the minor differences. The two top animals should be compared with each other, then the middle pair and lastly the bottom pair, first stating the placing of the ring. In comparing two animals, the superior points of the top animal are given first followed by a statement of the good points of the animal placed down. Often it may be more effective to mention the conspicuous faults of the animal placed down than to mention the superior points of the one placed above it. If the fourth place animal is an easy last, a statement of its outstanding faults may be sufficient, although it is generally considered the better method to emphasize the superior points of the animal placed up.

Notes should always be taken on the rings of livestock judged so that the contestant may use them in formulating a good set of reasons. These notes should contain the name of the class to be judged and the placing of the ring. They should also give the principal reasons for placing A over B, B over C, etc. Writing down any peculiarities of the animals judged will be an aid in recalling them to mind later.

After completing the inspection of the ring and the taking of notes, the contestant should go over in his mind, from his notes, the reasons for the placing of the class. In this way he will have formulated his reasons into an accurate yet brief statement of the ring of livestock under consideration. The following is an accepted form for giving oral reasons:

"I placed this class of Holstein cows D-A-B-C. I placed D over A because D has a stronger constitution, greater capacity, a more pliable udder, and larger and more tortuous milk veins than A. Too, D has a looser and more mellow hide. On the other hand, A has a more level rump, is a little finer at the withers, and has a more shapely udder than D.

"I placed A over B because A is more angular in type, sharper in withers, more level at the rump, leaner in the thighs, and is stronger in the back than B, showing superior type and dairy temperament. A also has a larger, softer udder and larger milk veins and wells than B. B may be criticized for being a bit drooping in the rump, thick in the thighs, and meaty in the udder, although she has larger capacity, a more feminine head, and more branching milk veins than A.

"Of the last pair I place B over C although C is leaner in the thighs and has a looser hide than B. I placed B over C because she has a longer, deeper, and more roomy middle, a more typical

Holstein head and horns, and superior development of the mammary system. B has a larger and better balanced udder, and larger, longer milk veins than C. C may be faulted for her lack of size and capacity, weak fore-udder, and short, straight milk veins."

### TEAM DEMONSTRATIONS

Team demonstrations should be included in the program of the Dairy Club. Practical demonstrations, well given, not only advertise club work but also many times introduce better methods to the community. Excellent training is also received by the team members in speaking before an audience and in careful thought and expression. Demonstrators should know their subject matter perfectly and be able to express themselves clearly before an audience. The demonstration should fully cover the subject and team members must be able to answer any related questions asked by the judges or audience. When written up the demonstration should last from ten to twenty minutes.

The following are suggested titles for demonstration teams:

1. The Babcock test.
2. Keeping dairy records.
3. Care of the cream separator.
4. The Methylene Blue test.
5. Dehorning methods.
6. Making ice cream.
7. Feeding dairy calves.
8. Fitting a calf for the show.

The following skeleton outline illustrates the general set-up of a demonstration. It may be written up and used if desired.

## DEMONSTRATION

## Preparing the Calf for the Show

Equipment needed: Calf, clippers, rasp, glass scraper, woolen cloth, oil, soap, water, blanket, brush, and charts.

Captain	Team-mate
Introduces team-mate and self. Explains purpose and value of fitting calf. Discusses feeding the show calf. "My team-mate will continue the demonstration with a discussion of the training a calf should receive."	Acknowledges introduction. Holds calf.
Assists team-mate.	Discusses and demonstrates training the show calf.
Discusses and demonstrates: <ol style="list-style-type: none"> <li>1. Washing.</li> <li>2. Clipping.</li> <li>3. Brushing and blanketing</li> </ol>	Assists team-mate.
Assists.	Discusses and demonstrates: <ol style="list-style-type: none"> <li>1. Trimming hoofs.</li> <li>2. Polishing hoofs.</li> <li>3. Polishing horns.</li> </ol>
Summarizes briefly the principal points of the demonstration. Asks for questions. Thanks audience.	
Both quickly and quietly remove equipment.	

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