SELECTING DAIRY CATTLE

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Circular 422
PROFICIENCY in the selection of dairy cattle cannot be attained thru the casual inspection of a few animals or even of a number of herds. Long experience or painstaking detailed study of many animals is necessary. While records of milk and butterfat production of a particular animal or its offspring form the most satisfactory index of the animal's productive value, such records are only rarely available and selection usually must be based largely or entirely on physical appearances.

In this circular emphasis is placed on the selection of animals for useful purposes—cows and heifers as present or future producers of milk and as breeding animals, and bulls as heads of herds. The plan of study suggested may seem needlessly time consuming, but to acquire skill in this field requires the same systematic effort that is necessary in nearly every line of endeavor.

The term "selection" is used in this circular in preference to the term "judging" because the latter is so commonly associated with the ranking of cattle in public exhibitions and may therefore be misleading.

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Club leaders may obtain copies of an 8-page supplement to this circular, entitled Suggestions for Teaching Dairy Cattle Selection, by writing to the University of Illinois College of Agriculture, Urbana, Illinois.
Selecting Dairy Cattle

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WHY STUDY DAIRY CATTLE SELECTION

MANY THOUSANDS of cows and heifers are bought and sold annually for dairy purposes merely upon the evidence which their external appearance gives of their ability to produce milk. Many herd sires are also bought solely on the basis of physical appearance. The buyer who knows the characteristics of good dairy type in cows has a decided advantage over the untrained buyer. A competent person can select high-producing cows with a fair degree of accuracy. On the other hand, a buyer who knows little about dairy type is likely to be sadly disappointed in many of his selections. Practically every cow has some good characteristics and some that are fair or poor. An experienced person can see and evaluate all these points, sum them up, and quickly arrive at an estimation of the productive ability of the cow.

Knowledge of the characteristics of good type in dairy cattle is of importance not only to the buyer of new female stock but also to the herd owner who wishes to raise the heifer calves from his best cows to replace cows no longer useful or profitable. If the quality of the herd is to be constantly improved, ability to judge good type is essential. Then, too, this knowledge is essential when it becomes necessary to select a sire to head the herd, for in most herds improvement in productive capacity is effected mainly thru the use of good sires.

Relation between form and production.—Simple and effective methods of measuring the milk yields and feed costs of cows are in use, so that a dairyman can readily determine whether a cow is producing milk profitably. The parts of a cow's body can be measured also, but no guides or charts have as yet been prepared which give reliable information about the shape and size that each part must be in order that a cow can be an efficient milk producer. Long experience and the observations of dairymen, however, together with the results of several scientific studies, indicate that there is a fairly well defined relationship between form and proportionate size of certain parts and production.
Fig. 1.—Dairy breeds differ in type and characteristics

Of the five major breeds of dairy cattle the Jersey excels in symmetry and development of the udder. The Jersey cow in the upper illustration shows the extreme dairy tendency, quality and refinement that are characteristic of the breed. The lower illustration shows a Brown Swiss cow having large size, large feeding capacity, strong constitution, and ruggedness characteristic of the breed. (For production records of the cows shown in Figs. 1-4, 6, 8, 10, 14, and 21, see page 47.)
The Guernsey cow pictured above illustrates the characteristics desired in this breed, such as good dairy tendency and angularity. These qualities are somewhat less pronounced, however, than in the Jersey breed. The large size, together with the great capacity for feed and milk production characteristic of the Holstein, is shown in the lower illustration. Brown Swiss and Holstein cows weigh from 200 to 300 pounds more than cows of the Jersey and Guernsey breeds.

The cow may be likened to a traveling manufacturing machine which is propelled under its own power. For greatest returns on the investment, the machine must be so strongly constructed (constitution and health in the cow) that it will continue to perform well over many
years. Capacity to use large amounts of the cheapest or most economical fuel (roughage in case of the cow) is desired. For greatest efficiency, no more weight than is necessary (surplus fat in the cow) should be carried. The manufacturing mechanism, which is the delicate part of the machine (udder in case of the cow), must have good capacity and not break down after two or three years' use. It has

Fig. 3.—The Ayrshire is distinctive in its breed characteristics

The Ayrshire breed is easily identified by its upturned horns, red and white color markings, good top lines, and well developed udders. In size the Ayrshire ranks midway between the Jersey and Holstein breeds.

been found that udders of certain shapes tend to break away from the body and become subject to injury and inconvenience in milking.

Unlike other machines the cow, during a part of the time she is manufacturing milk, is also performing another valuable function, that of reproduction. This requires a suitable form and capacity of the pelvic region of the body. In the absence of direct measurements which can be applied to the cow's body to determine whether it is fitted for performing all these functions efficiently for many years, the best substitute is the use of visual estimates based on careful observations of many cows over a period of years.
Efficiency of production and beauty of form can be combined in the same animal. The person who understands the principles of breeding and who knows good type can direct the production of animals which are beautiful as well as useful. This adds greatly to the pleasure of keeping and breeding livestock.

Knowledge of breed standards important.—Familiarity with the current ideas of other breeders concerning the accepted type of the breeds in which they are interested is very necessary for owners or managers of purebred herds in which a substantial part of the income is derived from the sale of breeding stock. The great improvements in production and refinement in type which have brought dairy breeds to their present high levels of efficiency are due largely to the cooperative efforts of breeders who have been striving toward definite ideals. Success for the individual breeder is partly dependent on his familiarity with the standards and ideals of the breed and on his ability to recognize how closely his own cattle approach the ideal. This applies particularly to the breeder who shows his stock at fairs. It has often happened that an owner had better animals at home than those he selected and led into the exhibition ring.

**TYPE ONLY A PARTIAL INDEX TO PRODUCTION**

Buying dairy cows on the basis of their physical appearance alone is, of course, not the ideal way; it has its disadvantages. Records show that many cows displaying good dairy type are relatively low producers, owing chiefly to their lack of persistency of lactation. They may produce 50 or 60 pounds of milk a day for a few weeks after freshening, and then decline in production rapidly and remain dry for 10 to 12 weeks. Other cows having no better form may produce an equal amount when fresh but sustain that production throughout the lactation period and be dry only 6 to 8 weeks. The difference in annual milk production may be as much as 3,000 to 4,000 pounds or more, yet even a person experienced in the selection of dairy cattle could not have distinguished between the producing ability of the two animals.

An experienced person is usually able to distinguish readily between cows capable of producing only 150 pounds of fat annually and those producing 400 pounds or more. Many cows of mixed dairy and beef breeding and inferior cows of the dairy breeds produce as much as 150 pounds of butterfat each, but most cows that yield 400 pounds or more possess good dairy characteristics. Very few persons, how-
ever, can distinguish between cows capable of yielding 400 pounds of butterfat and those capable of producing 600 pounds or more, for both classes of cows, in all probability, possess similar external evidences of good dairy type.

Some cows show good dairy type during most of the lactation period but when dry become so fleshy and blocky that they appear to lack dairy type and are mistakenly classed as low producers. The most accurate evaluation of a cow's producing ability is made a few weeks after freshening, when she is at the highest level of production.

It is in the selection of bulls for breeding purposes that the most serious mistakes are likely to be made. Too often the appearance of the animal is the deciding factor in a choice. Bulls of good type, it is true, tend to transmit good type to their offspring, but there is no certainty when good type is used as the only guide that the daughters will be good milk producers. In fact, the records show definitely that the daughters of certain bulls which had good dairy type yielded less milk and butterfat than their dams.

The most reliable method of choosing a herd sire that is likely to produce daughters of high milk and butterfat capacity is to select one that is already the sire of such daughters. In the event that a "proved sire," that is, one with daughters of known productivity, cannot be secured, the next best procedure is to secure one that has a dam and sisters with records of high production. If there are no sisters with milk and butterfat records, the records of the dam and granddams are the third best basis for estimating the value of the bull from the production standpoint.

Thus in the selection of dairy bulls, while good type is desirable, type alone cannot be relied upon as a complete index of the ability of the bull to transmit productive capacity to his offspring.

**WHY COWS ARE BOUGHT ON TYPE**

Since milk and butterfat records are a much more reliable guide than physical appearance in determining a cow's productive ability, the question naturally arises, why not buy cows upon the basis of milk records? There are two answers. First, the characters that determine milk production are inherited independently of those that determine body form, and therefore production records alone cannot be relied upon as a satisfactory guide for the selection of animals in building up a good dairy herd (Figs. 4 and 6). It would be futile to continue breeding for high production year after year without giving proper attention to the selection of body form which would assure maintenance of that production. Second, even if production records could be used as the
sole guide in cattle selection, the fact remains that production records of few cows are being kept.

There are two well-established agencies which dairy cattle owners may employ for securing production records, namely, herd improve-

![Fig. 4.—Production alone not sufficient](image)

The two Guernsey cows illustrated above have comparable production records. Which one would you select as a foundation animal for your herd? In order to assure maintenance of production, selection must be made not only on the basis of production records but also with proper attention to good body form.
ment associations and dairy cattle breed associations. Records are also kept by a few owners or their employees. Only 1.4 percent of the dairy cows in the United States, however, were included in herd improvement association work in 1934 and a still smaller percentage was under test by the breed associations. Rarely does an owner keep as careful records for himself as are kept by these associations. A conservative estimate of the proportion of all dairy cows in the United States for which production records are available is 3 percent. In the best dairy sections the proportion may be as much as 4 to 6 percent. This means that if one were to go to a dairy section to buy dairy cows with recorded productions he would be limited to 4 to 6 herds out of 100, or to 6 out of every 100 cows.

Buyers have found, however, that thru a knowledge of the characters showing dairy type, they can select good cows with a high degree of satisfaction. The fact that good cows without records do command good prices is of course one of the reasons for the owner's lack of incentive in securing tests of production.

**STEPS IN LEARNING TO SELECT DAIRY CATTLE**

(A) **Learn Names of Parts of a Dairy Cow**

In learning to select dairy cattle, first familiarize yourself with the names of the different parts of a cow's body that are in common use by breeders and others working with dairy cattle. Such knowledge is necessary in order to understand the discussions of a class instructor or of judges at fairs and also in order to be able to present your reasons for your own placings in understandable language. A list of these names, together with numbers indicating their location on the cow's body, is given in Fig. 5.

Be able to locate all these parts on a living cow and also be able to make a diagram and indicate the parts from memory. After this is done, you are ready to proceed with a study of dairy type and of the score card.

(B) **Become Familiar With Dairy Type**

First, know the features that constitute dairy type. This knowledge is necessary before you can proceed with any study of values and comparisons.

Cattle have been developed for two chief purposes, the production of milk and the production of meat. Refinement has been carried to such an extent that even tho all our cattle descended from the same sources, breeds kept primarily for milk purposes have a certain well-
Fig. 5.—The parts of a dairy cow

defined form, or dairy type. This form is modified somewhat in the various breeds by certain breed characters, but is, nevertheless, the outstanding feature of the conformation of all the dairy cattle breeds. Just as truly all the beef breeds have a distinguishing form, or type, called beef type, altho the beef breeds differ somewhat from each other in certain features of their form.

The distinguishing features of the dairy type of cow, as seen in a good dairy cow during the high-yielding part of a lactation period, are: (1) angularity of form, (2) development of milking organs, (3) development of feeding capacity.

1. Angularity of form. — After calving, a good dairy cow loses weight and becomes angular in appearance. This means that parts of the skeleton, such as the withers, shoulders, backbone, hips, and pin bones, project more from the body and appear to be much sharper. Fleshy parts of the body, such as the thighs and loin, also become thinner after calving. Instead of having a full, rounded appearance, the thighs become thin and the outer surface is somewhat incurving. The loin becomes better defined; the bony framework supporting it and adjacent to it becomes more distinct.

The skeletons of all cows are nearly alike so far as the shapes of the bones are concerned. Slight differences, of course, are found in the lengths of certain bones and the angles at which they are joined, and these slight differences often indicate desirable or undesirable features. For example, in some cows the tail setting is very sloping, tho it should be carried out level with the rest of the top line.

The dairy-cattle breeds differ in their angularity and there are also great differences between cows of the same breed in this characteristic, tho the best dairy cows are, as a rule, the most angular. Angularity of form and good dairy type as a whole are best exemplified

A term often used in discussing angularity is that of "wedge shape." The dairy cow is said to have three wedges. The front wedge is outlined by starting with the withers as the apex of the wedge and imagining lines drawn from the apex downward to the widest parts of the shoulders to form the sides of the wedge. The top wedge is formed by lines drawn from the withers as the apex to each of the hip bones, lines connecting the hip bones forming the base. The side wedge, as its name implies, can be projected when viewing the animal from the side. The sides of the wedge are formed by a line extending lengthwise of the top line of the animal, and by another line extending forward from the bottom of the udder past the bottom of the chest. It is usually necessary to project the lines forward some distance in front of the cow before they meet. In many cows, particularly those of the larger breeds, the wedges are not readily discernible, and in all breeds they are much less sharply outlined when the cows are dry and in good flesh. In this circular, therefore, but little emphasis is placed on wedge form and more attention is given to other phases of angularity.
In order to maintain high production year after year, a dairy cow must possess rugged constitution and physical stability and substance. The two cows shown above are exceptionally good producers. The upper one is constituted to withstand many years of production, while physical instability may limit the years of the second one's usefulness. This cow is in good health, as indicated by her fine, glossy hair and alert appearance. Her thin condition is caused by her inability to consume sufficient feed to supply nutrients equivalent to her inherited capacity for milk production.
in the Jersey breed. The Guernsey ranks next in angularity, followed by the Holstein, Ayrshire, and Brown Swiss.

Angularity is to some extent a relative matter, for the degree of fleshiness must be considered. Cows differ greatly in the amounts of flesh that they carry and even good dairy cows usually put on fat and gain in weight during the dry period. When fat, cows have a rounded, blocky form. Animals that have become very thin as a result of underfeeding for an extended period appear very angular because the outline of so much of the skeleton is visible. The angularity of cows composing a group, or ring, is evaluated best when all carry approximately the same degree of flesh.

2. Development of milking organs.—Cows of high production almost invariably have large udders and, as a rule, the udders of such cows remain large throughout most of the lactation period. The size decreases somewhat, of course, following each milking. Extending forward from the udder on the underside of the body are the milk veins, which carry blood from the udder toward the heart and in high-producing cows usually are large. They ordinarily increase in size from first calving up to maturity. A well-developed, large udder and large milk veins are good indications of dairy capacity, although they are not infallible guides.

Fig. 7.—A contrast in constitution as evidenced by width of chest

On the left is shown a chest of very good width, indicative of a strong constitution. The chest pictured at the right is very narrow and is indicative of weakness in constitution and general lack of stability. These details may be readily observed by noting the position of the front legs.
A high-producing cow requires a capacious udder. Ordinarily an udder which has a wide and level attachment at the front and a high and wide attachment at the rear possesses large capacity. When these attachments are deficient, a large udder becomes more and more pendulous, the capacity being taken care of by increased depth. A pendulous udder may extend downward so far that it strikes against the legs when the cow walks and is stepped upon by other cows when she lies down. An udder originally having good quality may, with continued striking by the legs, develop firm tissue in place of some of the secreting tissue.

Figs. 15 to 18, pages 32 to 35, show an udder of ideal form and others which depart from the ideal. In the ideal udder the fore attachment is nearly parallel with the underline of the body and the udder extends backward terminating in a high and wide attachment in the rear. As the attachments become shorter, the form of udder departs from the ideal. The fore attachment breaks away from the body and becomes more nearly vertical, so that a wide gap is formed between the udder and the abdominal wall. The rear attachment recedes from its high position and causes the udder to swing forward and the rear quarters to extend lower than the fore quarters. This often results in the teats pointing forward instead of hanging squarely as in the ideal udder.

The quality of the udder is one of its important attributes. Size alone is not a true indication of capacity. Some udders contain, in addition to secreting tissue, considerable amounts of connective, or non-secreting, tissue. This tissue gives the udder firmness in contrast to the soft, spongy texture of secreting tissue. The udders of greatest capacity have a high proportion of secreting tissue and they collapse, or reduce greatly in size, following milking. Udders with relatively small proportions of secreting tissue do not show so much reduction in size with milking and have a firmer consistency. Here again the stage of lactation must be considered, for immediately after calving udders are usually very firm or even hard, and for the first 4 to 6 weeks the udder of a high-producing cow is firmer than it is later.

3. Development of feeding capacity. — A striking and almost constant feature of dairy form in cows yielding large amounts of milk is their large middle, or barrel. The function of the cow is to convert pasture crops, hay, silage, and other bulky feeds which are not readily marketed, into products which are easily marketed and which are valuable as human food. Since such roughages are relatively low in nutrient value, a high-producing cow needs a capacious digestive system.
The barrel includes all the middle portion of the animal extending from the backbone to the under line and from the shoulders and chest.

Fig. 8.—A contrast in feeding capacity

Since there is a direct relation between feeding capacity and milk yield, it is essential that dairy cows have large feeding capacity. The upper cow has excellent capacity, as shown by great depth and width of barrel. The lower cow lacks depth and width.
to hip bone and flank, or it may be said to include all the region between the fore legs and rear legs except the udder. Capacity of barrel depends upon the depth of the barrel from top to bottom and also on its width, or the distance thru the barrel in a horizontal direction at right angles to the backbone. The size usually increases with age up to maturity and at any given time depends upon the amount and char-

Fig. 9.—A contrast in rump and pelvic development

The ideal form of rump and pelvic development is shown in the pictures at the left. Note the long, smooth, level development of the rump, with pin bones placed high and on a level with hips. The tail setting is also level and smooth and carries out neatly between the pin bones. The defective rump shown at the right is short, lacks smoothness, and is very sloping from hips to pin bones. Since reproduction is essential for the initiation of lactation, it is desirable that the pelvic region be so constructed that the cow is able to give birth to the calf with safety and ease. The broad, level rump is best for this purpose.
Fig. 10.—A contrast in rump and udder conformation

One of the serious faults found in cows with sloping rumps is that the udder tilts forward at an angle similar to that of the slope of the rump. In cows of this type the rear quarters of the udder frequently become overdeveloped, causing the front attachment to break away from the body and the udder to become pendulous. A level rump and an udder with a level floor are shown in the upper illustration, while the lower illustration shows a badly sloping rump and an udder suspended at the same angle.
Fig. 11.—A poorly shaped udder is a distinct handicap to a dairy cow

An extremely pendulous udder which is readily subject to injury is shown in the upper illustration. Such a condition is the result of a deficiency in fore and rear attachments. The lower part of the illustration shows an udder which is badly cleft, that is, there is a deep fissure between the fore quarters. The fissure may sometimes extend backward between the rear quarters also.
acter of the feed consumed. In a cow having good feed capacity, however, the barrel is usually of extraordinary size in comparison with the rest of the body.

![Fig. 12.—A contrast in rear udder attachment](image)

Poor type dairy cows (right) frequently are so narrow between the thighs that there is little possibility of rear udder development. Note at the left the extreme width between thighs which permits high and wide attachment and well-balanced rear udder development.

**(C) Know What Is Meant by Dairy Tendency**

High-producing dairy cows have a strong stimulus to convert the nutrients in their feed into milk rather than into body fat. This stimulus is an inherited quality and is found mainly in animals whose ancestors have been bred and selected generation after generation for high milk production. A cow having a limited inheritance of this stimulus is correspondingly limited in milk and butterfat production and when liberally fed converts a large portion of her feed into body fat.

Cows having a strong stimulus and ability to produce milk at times produce more milk than is warranted by their feed consumption. Following calving such cows usually draw on their body tissues for nutrients for milk production and lose weight, for they are incapable of consuming enough feed to support their high level of production. If at any time the feed supply is limited, or lacking in some nutrient, as when pastures are scanty or feed is too low in protein, cows having good dairy tendency use their body tissue for milk and become very thin. Under the same conditions cows lacking this characteristic tend to reduce their milk flow rapidly and become dry.
Most cows that have a strong stimulus for milk production have an angular form, with no more flesh than is necessary for good health and condition, extraordinary development of milking organs, and large feeding capacity in proportion to body size. It is this external evidence of productive ability, or dairy tendency, that is most often relied upon in selecting dairy cows. As previously stated, the most reliable guide to a cow's productive ability is a record of her milk and butterfat yields, but such a record is often not available.

**(D) Become Thoroly Familiar With the Score Card**

The score card is a convenient means of analyzing and studying the different parts of a cow. Memorize the score card and know how to make a detailed analysis of a cow, whether actually scoring the animal or comparing it with another. The score card names the important features or characteristics, and it assigns to each of these features the highest score possible for an animal of ideal dairy type.

Perhaps the greatest value of the score card lies in the fact that it calls attention to the individual parts or features of the animal, so that each of these must be studied as a separate unit. A general survey made without such a detailed analysis may fail to take account of defects or excellencies of parts having a very important bearing upon the closeness with which the animal approaches the ideal. Keep each of the points of the score card in mind as you study an animal, if you wish to make a competent selection.

**HOW TO USE THE UTILITY SCORE CARD**

The utility score card¹ (pages 24 and 25) in use by the Department of Dairy Husbandry of the University of Illinois is divided into four main headings. Under these are listed the main features comprizing these characteristics, together with a brief explanation of them.

Keep all these features in mind as you examine carefully the animal to be scored. Scoring work is customarily begun on an animal that is one of the best available representatives of its breed. Such an animal should have a fairly high total score. No animal, however, is perfect and it is usually possible by careful study to find some departure from the ideal in almost every feature. Occasionally animals are given a perfect score on some one point, such as quality.

¹This score card can be used with any of the dairy breeds, as all dairy cows of good production possess the characteristics of dairy type to a greater or less degree regardless of breed. This score card is called a utility score card because it attempts to place a value upon the cow both as a useful milk producer and as an animal which has desirable type for breeding purposes.
**Body form** is the first feature listed on the score card. Study the animal carefully and decide how closely it approaches the ideal in this characteristic. The first column at the right shows that the possible score here is 10. If you decide that the animal lacks about 15 percent of being the ideal type in body form, you will indicate a cut of 1.5 points. Enter this amount in the column for **Points deducted**. The next feature listed is **Dairy tendency**. If you grade the animal 10 percent deficient in this feature, enter the number of points deducted as .6, or 10 percent of a possible score of 6 points. When the scoring of individual features is completed, total the number of points deducted, and subtract from 100 to get the net result of your scoring.

The advantages of scoring by deducting a certain percentage of the possible score are very apparent after using this plan for a time. A suitable score may be arrived at more easily for features for which only 2 or 3 points are allowed if the percentage basis is used instead of a hit-or-miss plan.

As the amount to be deducted is very puzzling at first, it is necessary to adopt some sort of standard from which to work. Our best dairy cows do not generally score more than 90 to 93 percent of the ideal. In fact, it is seldom that an animal scores over 90 percent. In scoring, therefore, no cut should be made which is less than 10 percent of the possible score. If 10 percent is too great, enter the points deducted as 0. Animals which are markedly deficient in certain features may be given cuts of 25 to 33⅓ percent of the possible score. A cut of this size is considered a serious one. A cut of 40 percent is very severe and it is seldom that dairy animals of good breeding are given cuts of more than this amount.

The scoring of an animal having serious defects, abnormalities, or injuries is another difficult problem. When the utility score card is used, the amount deducted for blemishes, defects, injuries, etc., that do not interfere with the usefulness of the animal should be in a suitable proportion to the amount allotted for such abnormalities on the score card under the heading of **Style and activity**, which is 3 points. Some of the common defects, blemishes, or abnormalities that would come under this classification are: a crooked tail resulting from fracture or other cause; small enlargements of the knees; blindness in one eye; caking or inflammation of the udder following calving. Some of the more serious defects to which the note at the bottom of the score card might apply are: blindness in both eyes; failure of one or more quarters of the udder to function; greatly enlarged knees; severe lameness; badly winged shoulders.
MEANING OF SCORE-CARD HEADINGS

I. Characteristics indicating ideal body form and style

A. Body form.—Desirable features: A well-balanced proportion of parts and unmistakable evidence of the three distinguishing features of dairy type; namely, angularity of form, development of milking organs, and development of feeding capacity.

Undesirable features: Lack of angularity; poorly developed milking organs or feeding capacity; parts poorly proportioned.

B. Dairy tendency.—Desirable features: All prominent points of the body framework plainly visible, thighs relatively thin and wide apart to make room for udder. In scoring, consider both stage of lactation and breed.

Undesirable features: Blocky form with thick covering of fatty tissue. Heavy thighs set close together.

C. Size.—Desirable features: Large and well grown for age, without roughness and coarseness, breed considered. Large cows have greater producing capacity than small cows. The weights given are above the averages for the respective breeds.

Undesirable features: Undersized for age or distinctly stunted.

D. Rump.—Desirable features: Good length and breadth; level; evident capacity for giving birth to calf; freedom from roughness and coarseness; smooth, level top line. Cows with broad, level rumps are said to have more capacious udders than those with sloping rumps (Fig. 9).

Undesirable features: Rump sloping toward the rear (Fig. 13-B) as a result of the pin bones being lower than the hip bones; sloping forward (Fig. 13-G); or sloping to the side from the top line toward the thurls, even tho the top line may be nearly straight and level. Coarse and heavy tail setting (Fig. 13-B, C, H, and I), indicating possible lack of refinement thruot the cow's entire framework. Rump short (Fig. 13-F) and narrow at the hip bones or pin bones or in both regions; irregularities or niches in the top line (Fig. 13-D and E) which detract greatly from a pleasing appearance.

E. Refinement.—Desirable features: Bone medium in size for the breed; head, legs, and tail free from coarseness and apparent injuries. Long, slender tail and small horns, clean-cut appearance thruout.

Undesirable features: Heavy, coarse bones; patches of fatty tissue in region of rump, large amount of dewlap.

F. Style and activity.—Desirable features: Head held up strongly and the top line of the back nearly straight (Fig. 13-A). Strong, straight legs placed squarely under the body and a good carriage with regular and even gait. Docile but active and alert disposition, as shown by bright, prominent eyes and tendency to observe activities about her. All parts well proportioned and no marked defects.

Undesirable features: Dull, deep-set eyes; easily frightened and untractable. Rough, uneven top line (Fig. 13-B to I). A sway-backed top line detracts from the appearance of the animal but does not necessarily indi-
## DAIRY CATTLE SCORE CARD

### SCALE OF POINTS—COW

<table>
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<th>Characteristic</th>
<th>Possible Score</th>
<th>Points Deducted</th>
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<tr>
<td><strong>I. Characteristics Indicating Ideal Body Form—28 points</strong></td>
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<td><strong>Body form.</strong> Outstanding evidence of a high-class dairy cow, as shown by angularity of body together with pronounced development of milking organs and feeding capacity; parts well balanced with general symmetry throughout.</td>
<td>10</td>
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<tr>
<td><strong>Dairy tendency.</strong> Angularity and freedom from fleshiness (stage of lactation considered), as noted especially in shoulders, withers, vertebrae, hips, and pin bones; thighs thin and wide apart; neck long and slender; face broad between the eyes and well dished (breed differences to be taken into account); backbone prominent.</td>
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</tr>
<tr>
<td><strong>Size.</strong> Well grown and rugged without coarseness.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Desirable weights for mature cows when in milk: Ayrshire, 1,150 lbs.; Guernsey, 1,100 lbs.; Holstein, 1,350 lbs.; Jersey, 1,000 lbs.; Swiss, 1,300 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated weight of animal: No. 1; No. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct weight of animal: No. 1; No. 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Rump.</strong> Broad at both hips and pin bones; long; thurls wide apart and high; pin bones at nearly the same level as hip bones; tail setting smooth, and level with top line.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Refinement.</strong> Freedom from coarseness of bones as noted in withers, hip bones, pin bones, tail setting, legs, head, and horns; pin bones and tail setting free from patches of fatty tissue; small amount of dewlap; bone medium in size as indicated by clean-cut head and long, slender tail.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Style and activity.</strong> Head held up; good top line; legs straight; gait regular and even; wide-awake appearance, alert, active; well proportioned throughout, with pleasing appearance and absence of marked defects.</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Characteristic</td>
<td>Points</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Back. Straight; broad; loin broad</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Condition. Thrifty and vigorous, skin mellow, loose, of medium thickness, not papery or hard; hair fine and soft.</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

### III. Characteristics Indicating Feeding Capacity—22 points

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrel. Capacious; relatively long; deep in rear portion, especially just in front of the udder; ribs well arched, particularly in upper part; loin extending in width on both sides almost as wide as hips.</td>
<td>20</td>
</tr>
<tr>
<td>Muzzle and mouth. Wide, full lips; strongly muscled jaws; good teeth.</td>
<td>2</td>
</tr>
</tbody>
</table>

### IV. Characteristics Indicating Development of Milking Organs—34 points

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Udder. Size: when fully distended with milk, long and wide but without great depth; great reduction in size after milking, but retention of good shape.</td>
<td>8</td>
</tr>
<tr>
<td>Shape: wide, extending well forward and closely attached to body in front; rear attachment high and wide; rear udder extending full width between rather than in front of the hind legs; floor level without strictures or clefts; quarters uniformly developed.</td>
<td>8</td>
</tr>
<tr>
<td>Quality: collapsible and spongy in texture when milked out.</td>
<td>8</td>
</tr>
<tr>
<td>Teats. Uniform; of convenient size and length; free from lumps and warts, extra openings and leakage (extra teats objectionable if they interfere with milking).</td>
<td>6</td>
</tr>
<tr>
<td>Milk veins. Large, long, crooked and much branched; milk wells large and numerous (age of cow to be considered).</td>
<td>4</td>
</tr>
</tbody>
</table>

**Total possible score** | 100

**Points deducted**      | ____________

**Net score for animal** | ____________

---

1. Prepared and used by the Department of Dairy Husbandry, University of Illinois.
2. For marked deficiency in style or any serious abnormality, as many as 50 points may be deducted from the total score of an animal.
Fig. 13.—Some common faults in rump and top line

A. Ideal rump and top line. Note straight lines and attractive appearance; compare with Figs. 1, 2, and 3, pages 4 to 6. B. Pin bones too low, causing extreme slope from hip bones to pin bones. C. The sloping rump illustrated here is caused by the pin bones being set too low, as in B, but the tail setting extending upward tends to give the appearance, to a casual observer, of a nearly straight top line.
Fig. 13.—Some common faults in rump and top line (continued)

D. Irregular top line, showing niche in tail setting and weakness of back; also tendency for animal to be ewe-necked. 
E. Short, sloping rump with coarse bony tail setting extending far forward between hip bones. 
F. Curving top line, giving a very unattractive appearance in contrast to straight lines and attractiveness of A. Note the similarity in general contour of F and the cow shown in the lower half of Fig. 10.
Fig. 13.—Some common faults in rump and top line (continued)

G. Sway-backed individual with general slope of rump forward. H and I. Tail setting exceedingly coarse and bony, extending much too far forward on the top line. Extreme coarseness of entire rump. Note high withers and sway-backed appearance, which gives impression of lack of stability. Compare with appearance of cow in lower part of Fig. 4, page 9.
Fig. 14.—Winged shoulders may develop into a serious defect

The condition known as winged shoulders, shown on the above Guernsey cow, permits the shoulder bone and leg to project outward. Note the weakness resulting from the lack of firm union of the shoulder with the body.
cate physical weakness. The type of rump shown in Fig. 13-G is often associated with the sway-backed condition. Legs crooked as viewed from the side or rear; rear feet and legs turned outward; uneven gait; crooked neck, or ewe-neck; lameness; winged shoulders (Fig. 14).

Winged shoulders, a defect found occasionally, seems to be caused by a weakness in the ligaments and muscles which attach the shoulders to the other parts of the body framework. Usually the most noticeable effect is that the lower front parts of the shoulders project outward from the body, altho sometimes the most marked effect is that the elbows project from the chest. This defect is likely to become more pronounced as the cow grows older.

At this stage in the scoring, check for other marked defects which may interfere with the usefulness of the animal, such as greatly enlarged knees resulting from injury on floors; severe lameness; blindness in both eyes; loss of one or more quarters of the udder, etc.

II. Characteristics indicating constitution and health

A. Chest.—Desirable features: A deep, full, wide chest is indicative of good health and a strong body.

Undesirable features: Chest narrow at bottom, or floor; depressions back of shoulders indicating narrowness thru body at this point; front legs close together (Fig. 7).

B. Back.—Desirable features: A straight, strong back, with broad, level loin indicates a strong body framework.

Undesirable features: Greatly depressed back giving a sway-backed appearance (Fig. 13-G); narrow, sloping loin.

C. Condition.—Desirable features: A good condition of health is shown by a skin, or hide, which is pliable, loose and of medium thickness, having fine, soft hair, together with well-developed muscles showing vigor, strength, and adequate nutrition. At times the hair and hide may become rough and hard on account of exposure to hot sun or treatment with fly sprays and should not be interpreted as a condition of poor health.

Undesirable features: Hide very hard, hair rough and dry, with lack of luster, very thin condition of flesh, indicating poor health or under-nutrition.

III. Characteristics indicating feeding capacity

A. Barrel.—Desirable features: Great size in proportion to body as a whole, and good length and depth; great depth and width just in front of udder; a rounded appearance (barrel-like), with ribs extending outward from back bone and well arched, giving great width; loin broad and level. The barrel is given the second largest number of points on the score card. For this reason it should be given thoro study.

Undesirable features: Lack of length between fore and rear legs; upper part of ribs nearly straight and sloping sharply downward; lack of depth, often giving cow a “tucked up” appearance.
B. Muzzle and mouth.—Desirable features: Large mouth and strong jaws indicative of ability to consume large amounts of coarse feed.

Undesirable features: Very small head; narrow pointed muzzle; teeth badly worn or missing.

IV. Characteristics indicating development of milking organs

A. Udder.—Desirable features: Great width and length, but with depth no greater than the length; reduction in size upon milking; good shape (Figs. 11, 12, 15-18); soft and spongy when milked out, indicating high proportion of secreting tissue.

Undesirable features: Small size, does not extend far back between legs or far forward; front quarters drawn (broken) away from body, causing them to sag downward; extending downward a great distance (pendulous) (Fig. 11); little reduction in size after milking; firmness or hardness indicating lack of secreting tissue; lumps in udder; teats pointed forward or hanging close together (Figs. 15 and 16).

B. Teats.—Desirable features: Four in number; uniform in size and symmetrically placed on the four quarters of the udder; size and length suitable for easy milking; when cow is standing, all teats at same height from floor.

Undesirable features: Teats very small or short, or very large; teats very close together, interfering in milking; extra teats or extra openings which interfere with milking; teats which leak when udder is full; lumps or warts on the teats.

C. Milk veins.—Desirable features: Large veins with many branches extending forward from the udder; milk wells (openings in body wall thru which veins enter body) large to prevent constriction of blood flow.

Undesirable features: Short, small veins with few branches.

THE BREED SCORE CARD

Each of the breed associations has published a score card for its particular breed which differs somewhat from the general, or utility, score card. In the breed score cards features which the breed association wishes to emphasize are given special prominence or a larger possible score than in the utility score card.

In the score card for Guernsey cows, for example, 20 points are allowed for skin secretions because the breeders feel that this is a point in which improvement should be made. The Guernsey breeders desire to maintain a high yellow color in the milk, as the color of Guernsey milk is one of its strong selling points. While a direct relationship of this sort has not been satisfactorily demonstrated experimentally, the breeders believe there is a high correlation between the amount of the skin secretions and the degree of color in the milk.

The Jersey cow excels those of other breeds in symmetry and de-
Fig. 15.—Some common faults in udders and teats

A. Ideal udder. B. Udder ideal in shape and size but teats too short. C. Teats too long. D. Teats have enlargements at the base which interfere with milking. E. Udder “cut-up” or strictured between front and rear quarters, and front also weakly attached to body. F. Udder tilts forward, with capacity of front quarters much less than that of rear. Note extra teat, which is likely to interfere with milking. See discussion pages 14-15.
A. Udder too small, lacks capacity. B. Greatly lacking in capacity, and teats too short and slender for convenience in milking. C. Teats not properly distributed. Extra teat may interfere with milking or may have small ducts and leak milk. D. Poor front attachment and poorly developed rear udder. E. A funnel-shaped and pendulous udder. Such udders usually lack capacity and the teats often hang so close together that milking is inconvenient. F. Udder tilted forward to such an extent that milking is difficult.
Fig. 17.—Some common faults in udders

A. Ideal udder. B. Lacks development in fore and rear parts. C. Not closely and firmly attached to body in front, commonly referred to as "breaking away." D. Front shows further "breaking away," udder deficient in size. E. Udder deficient in front attachment and rear portion. F. Very defective front attachment and poorly developed rear quarters.
Fig. 18.—Some common faults in udders (continued)

All the udders shown in this illustration are defective in the front attachment and also have poorly developed rear quarters. C shows a pendulous, funnel-shaped udder. D, E, and F illustrate udders which are funnel-shaped and teats which point forward. Lack of capacity is one of the characteristics of udders of this sort. The teats in D are too small.
velopment of udder and in placement and shape of teats. This is the result of decades of emphasis upon these points, and the high score allotted on the Jersey score card to mammary development (38 points) is evidence of the value still placed upon these features by Jersey breeders.

The score cards published by the various dairy cattle breed associations are used in the same way as the utility score card. These score cards resemble in general the utility card, although there are several differences. The breed score cards do not classify the features, or characteristics, under a few main headings, as in the utility card. The “Scale of Points for the Mature Holstein-Friesian Cow” lists the parts as twenty-four separate items, including such items as ears, horns, crops, chine, and flanks not included in the utility score card. Much greater emphasis is given in the breed score cards to parts, such as rump and head, and to general style. Refinement and breed

![Fig. 19.—A high-producing herd is built up by careful selection of young stock](image)

Selection of young calves should not be limited to production records, but such records should be supplemented by a careful study of the type and individuality of the animals. Most of the desirable characteristics sought in the mature cow can be visualized in the young heifer. Interest and enthusiasm of father and son in the development of the herd can be maintained by mutual discussion and selection of the calf herd.
type is desired in all these parts so that animals will be good represen­
tatives of the breed.

The score cards published by the breed associations for bulls are
used in the same way as the score cards for cows. The descriptions
for many of the parts on the score card for mature Holstein-Friesian
bulls are identical with those for the cows. This does not mean, how­
ever, that the parts are exactly alike and that the head and shoulders
of the Holstein cow and bull, for example, are identical. The beginner
must learn the differences between the feminine and masculine types
and what constitutes the ideal type in both sexes. This cannot be done
merely by study of the score card. Thoro and painstaking studies of
the best representatives of the dairy breeds aided by the score card
and the guidance of an experienced person are the best means of
fixing the ideal types in mind.

COMPARATIVE SELECTION

Assigning placings, or rankings, to a number of animals in the
order of their excellence is termed comparative selection. The object
of comparative selection is to identify and rank dairy cattle according
to their usefulness as milk producers and as members of the breeding
herd. The score card is seldom used in comparative selection, but the
skill and knowledge acquired from its use are of great value in making
correct placings.

In selecting animals for purchase, a buyer may study carefully all
the animals in a number of herds and the herds may include from ten
to a hundred head. In public shows, as many as fifty to a hundred
animals may be entered in one ring, or class, and it is the duty of the
judge to select from the entire group a few of the animals which in
his judgment are the best of all those shown and to give them a rank,
or placing, in the order of their merit.

It is only after one has become familiar with the score card values
and is able to appraise an animal quickly that he can proceed compe­
tently with comparative selection. The beginner, when judging high­
producing cows, where constitution and health are often very closely
related to body form, will find it simpler to keep in mind only the out­
standing points concerning body form, feeding capacity, and milking
organs. By concentrating on these, he can, as a rule, evaluate a group
of good dairy cows quickly and satisfactorily. As he gains in experi­
ence, he will unconsciously become more discriminating and take into
consideration more of the details outlined in the score card. When one
has had sufficient practice in comparative selection, the process becomes
more or less automatic and one no longer gives so much conscious and studied attention to each minute detail.

**How to Proceed With Comparative Selection**

Begin the study of comparative selection by using *cows in milk*, since points of difference are more readily distinguished with this class of animals than with dry cows or heifers.

*As the cows are led about in a circle* 30 to 40 feet in diameter, stand in the center of the circle or far to the outside, not closer than 15 feet to the cows. Observe their general appearance and style, particularly the angularity, straightness of the back, levelness of the rump, size, straightness of the legs, the gait, and the presence of outstanding defects, if any. This view also gives a splendid opportunity to compare the feeding capacities of the animals as shown by depth of barrel and the relative sizes and shapes of udders. Note particularly while the cows are moving the straightness of the back and rump. A low back or a low rump or defects such as lameness may not be evident when the cows are standing.

*With the cows lined up side by side*, all facing in one direction, observe from the rear the character of the rump, the size and attachment of the rear udder, the straightness of the hind legs, and the width of the barrel of each cow. Walk in front of the cows, observe the angularity of the withers and shoulders, the character of the head, and the general quality and style of the animal.

*With the cows placed in a line one behind the other*, all facing in the same direction and quite near together, compare the top lines and the relative depths and sizes of the barrels and udders. Note also the levelness of the under lines of the udders and the placement of the teats. It is necessary to be at least 20 feet away in order to get the best comparison.

*Handling the cows* is the next procedure. This is done to verify observations made at a distance and to check up on points not possible to evaluate without handling, such as the thickness and mellowness of the hide, softness of the hair, and most important of all, the quality of the udder. Feel the front attachment of the udder to the body and make note of clefts or strictures between the quarters. Examine the milk veins and wells.

**Deciding on Rankings**

Having satisfied yourself that you have obtained accurate information regarding the excellent attributes or qualities, as well as the faults, of each animal in the ring, decide which is superior in the main
Selecting Dairy Cattle

39

features emphasized by the score card; namely, body form, constitution, feeding capacity, and mammary development. This is sometimes difficult, because nearly every animal has some good features and some poor ones. In deciding how much weight to be given faults, keep in mind the extent to which the faults affect the four main characteristics of a dairy cow, as indicated by the values on the score card. Suppose Cow A has crooked legs and a high tail setting but in all other respects is excellent, while Cow B lacks greatly in feeding capacity but in all other respects is very good. A would be placed over B because the faults of A do not carry so much weight as that of B (see score card, pages 24 and 25). Likewise, suppose C is faulted seriously for lack of size and capacity of udder but in all other respects is better than either A or B. Then B would be placed over C because the characteristics indicating development of milking organs are more important than feeding capacity, having a weight of 30 points against a weight of 22 points. It is not expected, of course, that one will keep in mind all the numerical values given on the score card, but he should know the relative importance of the main features outlined by it.

Very often the decision in the placing of animals is complicated by more factors than in the simple illustrations just given, but the same principles apply; and the necessity for thorough familiarity with and experience in the use of the score card is again apparent.

Selection of Dairy Heifers

The object in selecting heifers is to choose those which will develop into good dairy cows. There is no certainty that the parts which show desirable conformation will be equally good when the animal matures, there is a high probability that this will be true.

The first essential is that the heifer be a healthy, growthy individual with promise of developing into a cow of at least average size for the breed. A heifer with a rough, uneven coat of hair that is harsh and lacks luster and with a “pot belly” shows evidence of improper feeding and a stunted condition or of ill health. A bright, alert appearance, and a healthy coat of hair and pliable hide, together with a trim body having good length and depth and a full, rounded development at the heart girth, indicate health and vigorous growth.

Good dairy form, of course, is another essential. The heifer does not show as much angularity as the cow in milk, because withers, hips, and other prominent parts of the skeleton carry more flesh. She should, however, be without blockiness, such as thick, heavy brisket, thick withers and thighs, and meaty loin. The heifer shows greater dairy
Fig. 20.—Good heifers should replace cows removed from the herd

The two heifers shown above are offspring of parents that were selected for high production and for true type for the breed. The heifers show excellent dairy qualities, with promise of high production, and are excellent in breed type. Upper, Holstein; lower, Ayrshire.
Fig. 21.—Heifers just before first calving

These heifers show depressions, or settling at the pin bones, swelling in front of the udder, and marked congestion, or caking, of the udder. These abnormal conditions disappear within a short time after calving.
tendency, as indicated by angularity and freedom from fleshiness, after calving than before. The udder increases in size with age, but even in small heifers having good dairy tendency the udder shows loose folds of skin indicating possibility of expansion. The teats should be uniform in size and symmetrically placed.

*The feeding capacity* of the young heifer is not so great in proportion to body size as in the mature cow, but as the heifer approaches milking age, her feeding capacity should increase. Feeding capacity in the young heifer is shown largely by length of body, with ribs which are well arched in the upper part with a well-rounded barrel and deep flank.

*General appearance and style* should be considered. The bones should not be unusually large or coarse. Straight, strong backs and top lines, with heads well held up contribute to the pleasing appearance of an animal. Broad, level rumps are desirable for the same reason and also because breadth of rear quarters is thought to be related to milk capacity. Heads should show lack of coarseness, be broad in the forehead, and be trim and neat.

**SELECTION OF DAIRY BULLS**

Young bulls are selected in much the same way as heifers. Special attention, however, is given the *masculine features*. After 6 to 8 months of age the head of the bull becomes larger than that of the heifer and the neck becomes thicker and more rounded. As the bull becomes older his neck assumes the characteristic arch, or crest, which is lacking in the cow. Feminine-like heads in bulls are undesirable. The shoulders also become heavier, but the body as a whole should exhibit considerable angularity and freedom from blockiness. Heavy fleshing of brisket, loin, and thighs is undesirable. Viewed from the rear, the thighs should be only medium heavy with a tendency toward an incurring outer surface.

*Good feeding capacity* in the young bull is characterized by the same points as in the young heifer. With increased age, the barrel should become deeper and the flank be carried down well but, as a rule, the mature bull should not be so “paunchy” in appearance as the mature cow. This is partly a matter of so adjusting the roughage and concentrates in the ration that the bull will not be forced or allowed to consume a large proportion of roughage.

*Good size* is desired. Mature bulls, as a rule, should weigh not less than 50 percent more than mature cows of the same breed. This means that the young bull should show evidence of rapid growth and large
Fig. 22.—Selection of a young bull is more important than the selection of a heifer

Because the herd sire contributes his characteristics to all the calves born in the herd, care should be taken to choose young bulls with rugged constitution, good top lines, general refinement, and good breed type, as is shown by the Holstein calves pictured above.
Fig. 23.—Qualities desired in mature bulls

Both bulls pictured here show the desirable qualities of smooth, straight top lines, and long level rumps. They also have excellent feeding capacity, as determined by long and deep barrels. Note the masculinity of the head and neck without the sacrifice of a clean-cut appearance. Both are good representatives of their respective breeds. Upper, Jersey; lower, Holstein.
The bull calves shown above have well proportioned body parts without paunchiness. These characteristics indicate rapid growth and rugged development without coarseness. The alertness and vigor of these animals indicate good health. Upper, Brown Swiss; lower, Holstein.
size for his age. Such size requires strong bones, altho very large, coarse bones are not wanted.

*Good style* is shown by a clean-cut appearance, that is, freedom from folds of loose skin about neck and brisket, medium-sized bones, neat head and shoulders, and a straight top line. Shoulders which join smoothly to the body without deep depressions back of them, and a full development back of the elbows, showing a broad, capacious chest, are desired.

*Strong, straight legs and good feet* are especially desirable in the mature bull. Legs and pasterns should be so strong that the animal stands squarely on his feet.

*Common faults* in the bull are rough shoulders, narrow heart girth, sloping rump and small rear quarters. As in the cow, a sloping rump detracts greatly from appearance. In some bulls the rear quarters are very small and narrow in proportion to the rest of the body. A long, broad, and level rump is fully as important as in the cow, and when present the rear quarters are usually sufficiently developed to give the animal a well-balanced appearance.

Many of the other parts of the bull’s body not mentioned in this brief discussion are evaluated in the same manner as in the selection of the cow.
Form as Related to Production

That pleasing form and appearance may be combined with high production is evidenced by the advanced registry records given below of cows pictured in this circular. These records are for 365 days.

(Upper) FAIRY BOY'S GIRLIE 355769. Record: Milk 11,429 pounds; fat 584.9 pounds.
(Lower) MCJOHN'S NELLIE M. 17455. Record: Milk 19,566 pounds; fat 745.1 pounds.

(Upper) CHALLENGER OF PROSPECT'S PRIDE 164710. Record: Milk 10,673 pounds; fat 470.7 pounds.
(Lower) ILLINI FOBES BESS 1232104. Record: Milk 18,622 pounds; fat 590.8 pounds.

ILLINI BLUEBELL OF THE PLAINS 6th 103674. Record: Milk 17,652 pounds; fat 808.3 pounds. (State Class Champion 1934)

(Upper) JANICE'S BEAUTY OF IOLA 106456. Record: Milk 14,448 pounds; fat 703.3 pounds. (Class A)
(Lower) IMP. POLLY OF LATURQUIE 66025. Record: Milk 15,110 pounds; fat 705.7 pounds. (Class A)

(Upper) ILLINI PRINCESS TRITOMIA LADY 1408918. Record: Milk 18,442 pounds; fat 675 pounds.
(Lower) ILLINI HOMESTEAD PIEBE GIRL 1033689. Record: Milk 19,267 pounds; fat 612 pounds.

(Upper) ILLINI LADOGA AGNES ORMSBY 1232105. Record: Milk 18,741 pounds; fat 713.8 pounds.
(Lower) ILLINI PIEBE LADOGA AGNES 1408911. Record: Milk 16,993 pounds; fat 592.9 pounds.

(Upper) See Fig. 8 (Upper)
(Lower) ILLINI PIEBE PRINCE ONA GIRL 1465073. Record: Milk 17,451 pounds; fat 553 pounds. (Age 2 years)

ORNDALE VERA 272794. Record: Milk 10,588 pounds; fat 568 pounds.

(Upper) ILLINI ILLADOGO PRINCESS AGNES 1465083. Record: Milk 13,938 pounds; fat 522 pounds. (Age 2 years)
(Lower) ILLINI HOMESTEAD PARTHEA GIRL 464648. Record: Milk 20,393 pounds; fat 717.1 pounds. (Age 2 years, 11 months)

All the illustrations, except the drawings, shown in this circular are of animals owned by the University of Illinois. The drawings were made by Mrs. F. W. Cooke, under the supervision of the authors.