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Nebraska 4-H Beef Breeding Heifer Manual: Extension Circular 2-41-2

W A. Buchanan

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Nebraska 4-H Beef Breeding Heifer Manual

From Associate Member To Young Stockman

EXTENSION SERVICE
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U.S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR
Opportunities in the Beef Breeding Club Project

1. You can belong to a 4-H club with other members your age, and enjoy all the 4-H meetings, tours, camps, fairs, and other activities.

2. You will learn more about beef cattle and their place in converting feed into meat on Nebraska ranches and farms.

3. You will find out for yourself while you are young whether or not you like cattle well enough to be a successful stockman when you grow up.

4. You can own some cattle of your own and get a reasonable return for your time and work.

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Prepared by W. A. Buchanan, former county extension agent of Holt county and the staff of the Extension Service.
Angus and Hereford pictures were supplied by the American Aberdeen-Angus Breeders' Association, 9 Dexter Park Avenue, Chicago 9, Illinois, and the American Hereford Association, 300 West 11th Street, Kansas City 5, Missouri.
This beef breeding club manual will be used by club members with a wide variation in personal experiences. One member may have grown up on a farm or ranch that was stocked with good cattle ever since he could remember. The other extreme might be the boy who starts with one heifer and no previous experience with cattle of any kind.

Let's think first about the experienced young stockman. The breed is already selected. The ranch or farm layout is established. This member can usually find several calves or cows to choose from right at home. He just begins to take part in the cattle business easily and naturally, and enjoys his club work while he does it. This manual may have few new suggestions for him to follow, for he and his Dad already know a lot about cattle.

Now think about the other fellow, this little chap who lives on an acreage and never had a calf or cow around before. Maybe his parents know practically nothing about cattle. They want him to have some good 4-H club experience. A calf seems to be the most practical livestock project. It will be hard to include all he needs to learn in this one manual.

Most of the Nebraska beef breeding heifer club members will be somewhere between these two extremes. If you are on a ranch or farm where there is cattle, you can usually find some room for improvement and should therefore be interested in all the methods recommended in 4-H club work. If you have fed a baby beef or two and now want to start a breeding herd, you can make use of this manual in your club project. If you have had only mixed cattle on the farm and want to change to a high grade or registered herd in a practical and profitable manner, you can begin with the beef breeding project and make steady progress toward that goal.

Grade or Registered Cattle

The beginner can learn a lot with any kind of calf. From a dollar standpoint, it might be well to start with a moderately price calf, particularly if the member is only about ten years old and has plenty of time to learn by experience. However, if you are to get a real thrill out of showing your calf to visitors and if you get into show ring competition, having a nice, well-bred calf will help you hold your head up and take pride in what you are doing. Such a well-bred calf need not be a high priced registered one; it might be a high grade of one of the beef breeds and cost only a little more than the current market price.

If you have a little money saved from baby beef projects or other sources, and some experience with cattle you may start with several well-bred heifers, not registered, and a good registered bull. Some day you might buy some registered heifers if you decide to become a purebred breeder. In the meantime you should be able to make some money selling your surplus on the market. On the other hand, you may put your money into one or two good registered heifers with the hope that they will become the foundation cows of your future herd.

Not even the most experienced cattle breeders can look at young calves and tell for sure that they will turn out to be desirable foundation breeding stock. Good breeding, registration, and careful selection all help you to reach that goal, but the chances are less with just one or two head.
Herefords are commonly called "white faces" because their white face is a breed characteristic. Too much white is objectionable, particularly if it extends back beyond the shoulders to make what is called a "line back." Head, crest, dewlap, feet and legs, switch, and bellies are white on well-marked Herefords, and the rest of the body is a mealy red, not too dark brown nor too light red. This breed is most common in the ranch country of Nebraska. The cattle are rugged and excellent rustlers, well suited to the range conditions in which they live. They have larger horns than Shorthorns, generally light colored. Breeders have been improving the hind quarters and the balance between front and rear quarters in recent years.

There are separate registry associations for the breeds known as Polled Shorthorns and Polled Herefords. The cattle resemble the horned Shorthorn and Herefords except that they are naturally hornless or "polled." Stockmen who keep them say the polled cattle do not injure one another and do not waste as much feed as those with horns.

Before studying more about the beef heifer, it might be well for you to become familiar with some of the terms commonly used by experienced cattlemen, and to learn the names of parts of the heifer and cow.

The beef breeding club project is one in which you raise a heifer calf from weaning time until she is producing calves for you. Your goal is to use farm-produced grass, roughage, and grain to produce a calf crop. You may or may not exhibit at a fair. Beef breeding animals usually end up as meat some time, but in the meantime they are kept to produce calves.

4-H beefes, either steers or heifers, are fed for market, using more grain than roughage.

Commercial cattle are those produced for feeding purposes and for market as meat, in contrast to breeding cattle kept for reproduction.

Terms, Parts of Animal, Score Card

Sire is the father of an animal.

Dam is the mother of an animal.

Scrub cattle are animals of mixed or unknown breeding without definite type or markings.

Grade cattle are the offspring resulting from mating purebreds with scrubs or from mating animals not purebred but having close purebred ancestors. The offspring of a purebred and a grade is also a grade, but is generally called a high grade.

Purebred cattle are of pure breeding representing a definite, recognized breed. Both parents were purebred animals of the same breed. To be considered purebred, livestock must be either registered, eligible to registration, or (in the absence of public registry for that class) have such lineage that their pure breeding can be definitely proved.
Thoroughbred, a term often used incorrectly, applies only to a breed of horses.

Registered cattle are those on which the papers have been kept up to date in the records of the association which promotes the breed. If the sire and dam are registered, the owner of the calf at the time of birth can register the calf unless it has some disqualifications.

Pedigree is a record of the ancestry of an animal showing the names and registration numbers of sires and dams for several generations.

Registration certificate is the paper completed by the breed association showing that the animal named and identified on the paper has been registered in the official records of the association.

Registry Association is a group of breeders interested in one kind of livestock, with an organization, officers, dues and fees, an office with records of value to the breeders, and usually some fieldmen who promote the interests of the breed and the breeders.

Crossbred cattle are those from a sire of one breed and a dam of another breed. Neither sire nor dam need be registered, although they may be.

Line-bred cattle are those from sires and dams that are related, but not to the extent of inbreeding.

Inbred cattle are those produced by mating dams to their sons, or sires to their daughters, or full brothers and sisters. This is sometimes called "close breeding," and the term "inbreeding" sometimes refers to the mating of any closely related cattle.

Outcrosses are cattle from sires and dams that are not related for four or more generations in their pedigrees.

Polled cattle are those born without the ability to grow horns.

Beef type refers to the build or conformation of the body. The desirable type is blocky, deep, wide, smooth, thick-fleshed, short-necked, short-legged, straight-backed, with quality in the hair, hide, and bone.

Condition is a term describing the amount of fat or finish an animal carries. Breeding condition generally indicates normal, healthy fleshing without much fat. Show condition often refers to the high degree of finish obtained in show herds on the fair circuit.

Brood cow is one that has produced a number of good calves. A good brood cow gives plenty of milk to grow a good calf, breeds regularly to have a calf every year, and is sensible and easy to handle. She is healthy and able to maintain her own body weight and condition year after year.

Foundation cow is the brood cow every one would like to have, the one which helps build the future herd. Even the most successful breeders have only a few of them.

Ration refers to the feed given to an animal, including grass, roughage, grain, water, and minerals. It is sometimes called a balanced ration, a complete ration, or a high or low protein ration.

Digestible nutrients are the parts of feed that are digested by the animal to help it grow, maintain its body, and reproduce.

Concentrate is a word used to apply to grains and their by-products, in contrast to the more bulky roughages.

Roughage includes hay, fodder, straw, silage, grass, and similar bulky feeds that cattle eat.

Protein is the part of feed that helps build muscle, tissues, hair, and hoofs.

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Parts of a Beef Heifer

- **Rump** - Long, Wide and Level
- **Tail Head** - Smooth
- **Ribs** - Close Together
- **Quarters** - Deep and Full, Thickly Fleshed Down to Hock
- **Flank** - Full and Deep
- **Legs** - Short and Straight
- **Bone** - Ample, Neither Coarse nor Fine
- **Neck** - Short and Thick
- **Eyes** - Prominent and Wide Spread
- **Head** - Short and Wide
- **Muzzle** - Wide and Flaring
- **Shoulder** - Smooth
- **Heart Girth** - Full and Deep
- **Dewlap** - Neat
- **Chest** - Wide and Full
- **Knees and Hocks** - Close to the Ground
- **Legs** - Straight and Short
Protein supplement or high protein feed includes the oil meals, animal by-product feeds, and grain by-product feeds that contain more protein than common grains and roughages. There are many commercially mixed feeds classified as protein supplements and high protein feeds.

Carbohydrate is a term used to include the starchy foods that produce heat, energy and fat.

Carotene is a red or yellow compound found in plants. It is a good source of Vitamin A for cattle.

Vitamin A is produced from carotene in the digestion of food by cattle.

Palatability of a feed refers to how well cattle like it.

Preservative in silage is the corn, molasses, dry fodder, or similar starchy material added to hasten the fermentation process after the silo is filled.

Health certificate is an official statement from a veterinarian and the State Department of Agriculture showing the condition of health of an animal. It usually includes a record about tuberculosis and brucellosis. It is commonly used in connection with shipments between states, exhibits at fairs, some types of sales, and Grade A milk production.

The Score Card

The following rather general score card for breeding beef heifers should be useful for beginners in drawing attention to the various parts of the animal, the relative value of each part, and the importance of breed characteristics.

<table>
<thead>
<tr>
<th>GENERAL APPEARANCE</th>
<th>10 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact, deep bodied, wide, carrying width straight and square from front to rear. Straight top and underlines. Short legs, and neck, and various parts of body fitting together to give balance and style. Females matronly, and having quality and feminine appearance throughout.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WEIGHT, GROWTHINESS, and SIZE</th>
<th>8 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age and condition to be considered but animals must show lots of growthiness and ability to develop.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLOR</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color and color marking to be correct for each breed.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FLESH</th>
<th>9 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep, firm, smooth, uniform coating of flesh over all parts and free from patchiness.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SKIN</th>
<th>5 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of moderate thickness, mellow, pliable and loose, with a thick coat of long silky, fine, curly hair.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEAD</th>
<th>8 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forehead broad and prominent, face short, muzzle full, nostrils wide and open. Eyes large and expressive. Ears of medium size, well set, and well covered with hair. Head should be of medium size, clean cut, and showing much femininity.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NECK and THROAT</th>
<th>4 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean cut without any excessive development of hide, flesh, or fat. Neck short, neat, and blending smoothly into shoulders.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SHOULDERS</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight, smooth, evenly laid in with the neck and the ribs; compact and broad on top, well covered.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CHEST</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep, wide, especially on bottom; full just back of shoulders, giving a full fore flank.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BRISKET</th>
<th>1 point</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not too prominent, wide, moderately deep free from flabby flesh or loose, wrinkled skin, and carried well up to the breast bone.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RIBS</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well sprung from backbone, close together, with plenty of length to give depth to body, and carrying full width of shoulders, and deeply and smoothly covered.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BACK and LOIN</th>
<th>10 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back and loin wide, and deeply covered with flesh. Topline straight. Hooks level, smooth, well laid in, and well covered with flesh.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RUMP and TAIL</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rump long, wide, level, smooth, and well covered; carrying width to pinbones in proportion to width of loin. Tailhead level with line of back, tail dropping at right angles to backline.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>QUARTERS, THIGHS and TWIST</th>
<th>8 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarters long, straight, muscular, full and deep in the twist and flank. Fully fleshed down close to hock.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>UNDERLINE</th>
<th>2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight, flanks deep and full.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEGS</th>
<th>6 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short, straight and squarely placed, perpendicular both from side and end view, forearm muscular, bone strong with considerable substance but clean cut. Hind leg well fleshed beginning immediately above hock. Animal should walk straight with active step, aiding in giving stylish appearance.</td>
<td></td>
</tr>
</tbody>
</table>
Selecting Your Breeding Stock

You have several choices in starting this project. You may begin with calves, yearlings, or cows already on your place. You may select from a neighbor, or buy some from a good cattlemen some distance away, or be the high bidder at an auction sale.

It is quite common for club members to start with a heifer calf just weaned—generally in the fall of the year. Yearling heifers bred to a good bull can often be bought worth the money in comparison to the price asked the high bidder at an auction sale.

You can always learn something by visiting a successful breeder's herd. Even though he makes it his business to be a good host and takes time to show you his cattle, it is only fair to let him know ahead of time about when you would like to make the visit. Tell the breeder what you have in mind and ask his opinion about which animals might be most satisfactory for you. Do not be afraid to ask him questions. Try to make complimentary remarks about the good things you see.

Probably the best time to make this visit to buy heifer calves is in September to November and if possible before the calves are weaned. Then you can see the calves with their mothers and pick those that have grown well, indicating that the cow has been a good mother and that both she and the calf are of desirable beef type. The trend now is away from the extremely smooth, refined, pony type calves and toward the more growthy ones that put on the pounds and develop into big, well fleshed cows. The extreme, leggy, rough individuals should be avoided even though they might weigh the most. Dwarfs do not make satisfactory breeding animals.

Look over the entire cow herd to see if it is uniform in size, color, desirable type, and condition. If it is, the owner has been a good livestock breeder and the calf crop is likely to continue to be uniformly satisfactory. Check to see if he has had a full calf crop, an indication of a healthy, producing herd. Ask about his Bang's vaccination program. You can look at the herd bulls if you wish, but the best measure of a good herd sire is his calf crop.

When you are satisfied that this herd is a good place to get your start, pay attention to individual calves, yearlings or cows, whichever you have in mind. Viewed from a distance, the animal should appear low-set and free from waviness on top. Both front and rear flanks should be deep and the chest deep and wide. Necks of desirable beef animals are short, the head is short and broad, eyes prominent, muzzle wide and nostrils open. Viewed from the rear, the animal should be broad over the back and loin, uniform in width from shoulders to hooks and almost as wide from hooks to pinbones. The round is full and smooth and deep. Legs are short and straight and the animal will walk easily without twisting her body out of shape. The coat of hair will be rather heavy, depending of course on the time of year, and it will show healthy luster if the animal has been doing well.

Each breed has some definite characteristics in shape and conformation, color markings, and behavior. A desirable brood cow of any breed is calm and quiet and will respond to good handling. The owner generally knows which cows have these habits and may be able to help you pick that kind of calf. If you just want a calf to learn with, you might get along with one that is off-color or lacking in breed type. If you want one to start your herd and one that you can show to folks without making apologies, it will pay you to stick to the kind that good breeders would like to keep in their own herds. You may have to pay a premium for such an animal, but it will probably be a good investment in the end.

There are several other ways to select your first breeding heifers. You may visit the neighbor just down the road. He may have only a few to choose from. His best ones might be as good as the average from a big herd farther away. If he is a good neighbor, he will stand back of his sale and come over as often as he can to see how you are getting along. Buying something from a long way off seems to have some kind of appeal for most of us. Many a livestock buyer has made the trip and brought home a herd bull or some breeding heifers only to find that they are no better than those at home.

You can buy breeding heifers in an auction ring. You must be the last and highest bidder to get them. It is best to look them over before the sale, and set a definite price, with the help of your father or leader, as the top bid you would make on each animal or lot. Select more than one on which to bid. Your second choice may be the best buy. Then at the auction, keep cool, remember your bids as you make them, and stop bidding when your price has been reached. Better to go home empty handed but with a full purse than to be carried away by the chant of the auctioneer and the price someone else is willing to pay.

You may buy your calves or heifers by the pound but you are more likely to pay by the head for breeding stock. How much to pay is often a problem. Except for well bred, registered animals, the price per head each year is in line with the market price of commercial cattle of the same age. Many stockmen are happy when their calf crops average 400 pounds per head at weaning time in the fall. A few calves on exceptionally good mothers may weigh up to 500 pounds if they have started eating grain in a creep. The run of the crop usually weighs about 350 pounds, and the small refined ones or those on mothers that are poor milkers may scale only 250 pounds. Some men who see cattle weighed often can guess weight within a few pounds, but the only accurate way to do it is on scales. Growthy calves that are wintered well on hay and a little grain should put on a pound to a pound and a half per day, and continue to gain at that rate on good grass the next summer. Four hundred pounds at weaning time plus 50 pounds per month after that time would be an easy way to figure top weight for a well grown calf.

Many studies are being made of birth weights and rates of gain on beef calves in an effort to pick out the bulls and cows and families that produce the most beef for the feed used and the time spent. As you develop your breeding herd, you should study these reports and apply the good practices to your own breeding program.
Those of you who have grown up on livestock farms or visited breeding herds and ranches know that beef cattle graze in pastures fenced with barbed or woven wire, and that they are corralled in small lots fenced with more wire and posts or with board or plank fences. Stockmen use strong posts and heavy plank to make catching and holding pens, stalls and chutes. They swing big gates on strong hinges to sort the cattle. They load them, dip them, weigh them, dehorn them or treat them for diseases or parasites in chutes and squeeze pens and stocks that are built strong enough to resist all the efforts of the animals to get away. Very few range-raised beef cattle are broken to lead with the halter. Some of them never get inside a shed or barn.

Before you bring a new calf or cow home, figure out how you are going to unload her from the truck and where you can keep her for the first few days so that she cannot possibly get out. She will probably come loose in a stock truck, ready to jump out and run as soon as the endgate is raised. Stop the truck at the chute, or as near the stall or pen as possible, and use temporary gates to get her from the truck to the stall, without any chance for her to be frightened or angered or to get away. Give her some hay and tie a big pail or small tub of water in one corner, and leave her alone. She will probably bawl until she squeaks and refuse to eat or drink for a while.

A clean, dry stall, a grain trough about 12\" x 18\" about 6" deep, a hay manger in the stall, the water pail or tub for a few days, and then a good corral and pasture with a hay manger outside is about all the equipment you need. Beef cattle like to be outdoors the year round, and need shelter only from wet weather and bad snowstorms. In hot weather, good shade from trees or an open shed is essential.

You may want to halt-break your heifer, particularly if you are going to show her. Use a strong rope halter. A curry comb and brush, hoof trimmers, fly sprayer, dehorning compound or dehorners if you want to take off horns, rasp and emery cloth and polish if you keep the horns and show the calf, and a few other items are needed as you continue your heifer project.

Winter Rations for Calves

If you start with a calf just weaned off a good mother in the fall, the calf will have a good covering of milk-and-grass-produced fat. Her coat of hair will be smooth and glossy. She will be in her prime as a baby calf. Your job is to change her feed ration to hay and grain and not lose what she has gained.

It would be a waste of good feed to give her as much grain as you would a baby beef for the market. She might be wintered on hay or other roughage alone, but she would not gain much if any weight, and would look rough and thin the next spring. Somewhere between these extremes is where you should plan your first winter feeding program. Many research tests have shown that a little oats, bran, or protein with prairie or bromegrass hay will be well worth the cost for growing heifers the first winter. Remember, your reason for keeping her is to convert some home-produced feed into more money than it is worth as feed to somebody else.

A calf that has had no grain while on the cow will probably start nibbling at whole oats about as soon as any grain. Give her a feed of hay and put a handful of oats in a pile on top of the hay. Put a few more oats in a feed trough where she can find it. If she gets it dirty before she eats it, clean it out and try again. Range calves will sometimes start to eat grain in a day or two if they have a hungry home-grown calf in the pen to show them how.

Other grains and protein feeds can be combined according to the roughage available. If good quality alfalfa is being fed, try a mixture of equal parts by weight of shelled corn and whole oats. If the alfalfa is only of fair quality, one of the following mixtures would be satisfactory: one part corn and two parts oats; or equal parts by weight of corn, oats, and wheat bran; or a mixture of two parts corn, two parts oats, and one part linseed or soybean meal or pellets. Other grains that might be substituted are mentioned later. Bright green, early-cut prairie or bromegrass hay is about equal to fair quality alfalfa hay for growing heifers. If the prairie or brom hay was cut late, however, it is much lower in protein and feeding value, and more protein should be mixed in the grain ration.

When your heifer is eating grain well, she should have not over a pound of grain per day per hundred pounds she weighs. She will probably eat and waste three to four pounds of hay per day per hundred pounds of weight.

Loose, iodized salt should be kept in a box out of the weather so she can get to it all the time. Steamed bone meal, with 10% salt added for palatability, in a box close to the salt box will supply the calcium and phosphorus she needs. Plenty of clean, ice-free water all the time is another important part of the feeding program. If you keep your heifer in a stall part of the time, either make the water available there or turn her out twice a day to drink.

This is only one of several practical feeding programs. You may want to use the fall growth of weeds, the cornstalks, some bright straw, corn fodder, cured sorghum, or silage as part or all of your roughage. You may have plenty of oats and be short of some other grain. One kind of protein feed may be higher in price than some others. Study the paragraphs that follow and try to balance your rations to save the most money but still get satisfactory growth on your heifer.
The Summer Feeding Program

After this first winter, grass is your cheapest and best feed. When spring comes, you may be tempted to turn your heifer out too early on grass and let her go for the summer. She will pay you for a little grain when the grass becomes dry or mature. This is particularly true if you want to breed her to calve before she is three years old. A well grown beef heifer can calve at 27 to 30 months of age and develop into a cow of normal size if she is well fed as a yearling and while she nurses her first calf. The grain for the yearling can be the same mixture as you used the first winter, fed at about half the rate you used in the winter time.

Feed for the Bred Heifer

During the second winter, your heifer will probably be bred to calve between the time she is two and three years old. She can consume a lot of roughage and needs only enough grain to keep her in good condition, not fat. Many cattlemen do not feed grain to the breeding herd except to the calves the first winter. Again the protein content of the grain should be adjusted to the type of roughage she gets, and the amount of grain to the condition of the animal. If she calves while on grass, no particular change need be made in the grain ration before and after calving. If she calves while on dry roughage, additional bran in the grain ration may keep her digestive system in good shape, and she may need additional carotene in green leafy alfalfa or high grade silage. About five pounds of top quality alfalfa hay per day should be enough to supply the carotene which she will convert into Vitamin A.

Feeding the Cow and Calf

If you get your first calf from this young cow before she is three years old, both she and her calf should have some grain available while the calf is nursing. They can eat together if you have just the two of them in a pasture or stall. You are more likely to have them with other cattle and you may find a creep for the calves very practical. Calves are curious enough in investigate any new thing in the pasture or lot, and will get into a creep and find the grain within a few days. Put the creep near the watering place so the calves will find it while the herd is resting after drinking. Whole oats are the best grain to put in the calf creep feeder. They should be well protected from rain and wind. Calves are not likely to overeat in a creep, especially if they have good mothers and plenty of grass.

Later, when your young cow has weaned her first calf, she will be fed as a dry, pregnant cow for about six months before she calves again. If nursing the calf pulled her down some in flesh, she will need feed to build her body up again and to produce the second calf. About five pounds of green, leafy alfalfa per day in the winter will supply the carotene she needs. The additional roughage might be alfalfa, but other roughages may be used which are lower in price and total feed nutrients if the ration is made adequate by adding protein and minerals. She may be low in calcium and phosphorus after raising her calf, so steamed bone meal and salt should be available free-choice in a box protected from the weather, and iodized salt should also be there handy all the time. One per cent bone meal and one per cent salt can be added to the grain mixture also if the cattle do not seem to be taking much out of the boxes.

Winter Rations for Cows

A wintering ration for dry, pregnant cows might include 5 pounds of green, leafy alfalfa hay, 15 or more pounds of prairie or brome hay, and two pounds of cracked corn, whole oats, or rolled barley per day per head. Thirty pounds of silage with some grain in it, five pounds of good alfalfa hay, and unlimited straw or fodder would make a good ration. If the roughage is of poor quality and low in protein, a pound of protein cube or cake per head per day will supply the protein needed. The amounts suggested are for cows weighing less than 1200 pounds. Big cows and those that are thin in the fall may need more. The objective should be to put the cow in good condition to drop a strong calf and to have plenty of milk to nurse him well. Profit from a beef herd depends a lot on the regularity of calving and the size of the herd and the weather, and iodized salt should also be there handy all the time. These two factors are very closely connected with the health and condition of the cow herd year after year.

Good Pasture

In studying the kinds and qualities of feeds for beef cattle, you should begin with the grasses and other green feed that are commonly available. In the farming section of Nebraska, beef cattle can pick their own roughages over half the year in pastures, stubble fields, cornstalks, and winter wheat fields. Many ranchers have summer and winter range and feed hay only when the snow covers the grass.

The best eastern Nebraska pastures will carry one to two head per acre when plenty of moisture is available. Irrigated pastures will do even better than that. The range country in the sandhills and in western Nebraska will average about 15 acres per head in carrying capacity. This grass may not look like much feed, but it is high in feed value and cattle do well on it both summer and winter.

You can increase the carrying capacity of any pasture by keeping just enough stock on it to graze off the best grasses before they become coarse and woody; by rotation grazing, which is putting on a large number of head per acre for a few days and then letting the grass grow for two or more weeks before grazing it again; by clipping weeds regularly to keep the annual weeds from going to seed, and by spraying to kill dandelions, ragweed, and other common weeds; by fertilizing with a good application of manure or with commercial fertilizer high in nitrogen; and by irrigating for a season to let the more desirable grasses come back; and by irrigation of most pastures except those that are low and wet and already subirrigated.

Native grass in each section of the state makes ideal beef cattle pasture. Bromegrass in eastern Nebraska or a bromegrass-legume mixture is also excellent pasture if given enough nitrogen in fertilizers or manure to keep it from getting sod bound. Buffalo and grama grass are the common short grasses of western Nebraska while new kinds of wheat grasses introduced in the last few years offer promise for additional forage.

The permanent pastures on farms and ranches are always supplemented by running cattle on the stubble fields after small grain harvest, by picking over the cornstalks in the fall, and by letting the cattle run on the winter wheat and rye after it has made a good growth in the fall. In fact, it is common practice to let the cattle have the run of the farm after the crops are harvested. Using roughage that would otherwise go to waste is good economy if not pushed too far. The condition of the cattle should be watched, and when they are not getting enough
good roughage to stay in condition additional hay or other
dry roughage should be fed. The total feed obtained from
wheat or rye pasture in late winter and early spring may
not be very great, but the carotene in the green feed may
be just what the cattle need to tone them up.

Temporary pasture can be sown each year to add to
the permanent pasture supply. Rye is commonly used
for a few weeks in the fall and for about two months in
the early spring. Oats and barley make excellent pasture
for about six weeks in May and June. Sudan grass, from
certified seed, is probably the best hot weather temporary
pasture in much of Nebraska. If you want to keep your
beef breeding project animals by themselves, or to give
them some extra boost with pasture, using some tempo-
rary pasture in small lots near the buildings may be the
way to do it. It is surprising how much feed can some-
times be obtained with just a little trouble and seed.

Silage is used on some farms to supplement pasture
during dry spells. Having some available will not only
help the cattle but often save the pasture from over-
grazing. Cattle seem to like a little dry roughage even
while on the best of pasture, so feeding just a little coarse
dry hay in the summer time is a good practice. Some
stockmen think this helps to avoid bloat, and even the
posioning that occurs occasionally on sudan grass.

Dry Roughage

The dry roughages that are fed in winter are nothing
more than cured grass or other growing plants that might
be eaten in the summer. The more nearly the cured feed
can be like good June pasture, the better the cattle will
do on it. Keeping the green color in hay, preserving the
natural aroma, avoiding mould and dirt and trash in
making hay will all add to its value as feed and cut down
the waste when it is fed.

Prairie hay is the most common roughage for beef
cattle in Nebraska. Cutting it in June and early July
while it is bright and green adds to the palatability and
the protein and carotene content. Cutting it in August
and September produces more tonnage in some cases but
the quality of the hay is much lower because the grass
has matured, the cattle do not like it as well, and the
protein and carotene content is only half or less as much
as in the early-cut hay. Supplement with a little legume
hay or with silage, prairie hay can be the sole roughage
for beef cattle through the winter. Many cattle are wintered on this hay and a little protein supple-
ment or grain.

Alfalfa hay makes excellent roughage for beef breed-
ing stock. If it is of good quality it will supply the protein
and carotene needed. Low quality alfalfa, some that is
coarse or rain damaged or poorly cured, is about equal
to good prairie hay in feeding value. Many stockmen will
stretch out a limited supply of top quality alfalfa by feeding
only about five pounds per head per day and then
giving the cattle the other roughage they want.

Red clover hay, when well cured, is about equal to
alfalfa in protein content and feeding value, although it
may not have the carotene that is found in green, leafy
alfalfa. Sweetclover hay is not as palatable and feeding
a lot of it for several weeks tends to thin the blood of the
cattle. Mixing it with other roughages may avoid that
trouble.

Bromegrass hay is about equal to good prairie hay
in feeding value. Cutting it when the leaves are just
reaching their maximum growth and before the hay gets
tough and stemmy will make the best hay. What is left
after a seed crop is taken off is not worth much in most
years. Brome-legume mixtures are higher in protein
in proportion to the amount of good legume hay in the
mixture.

Sudan hay is about equal to average prairie hay if it
can be cured well. Mowing it when it is about knee high
may result in very high protein feed, but the tonnage is
not great and proper curing may be difficult. Millet hay
is "washy" feed, not very popular except as an emergency
crop after a hail storm has spoiled a grain crop.

Sweet sorghum fodder makes a very satisfactory,
low protein roughage when prairie hay or alfalfa hay or
silage is not available. It can be fed like hay, chopped,
or shredded. More protein will be needed than with the
best quality hay.

Grain sorghum fodder is dry and pithy and unpalat-
able, about like straw in feeding value.

Corn fodder, if cut and cured with the green leaves
on it, makes winter feed about equal to sweet sorghum
fodder. It is low in protein. Using good alfalfa with it,
and feeding protein cake or cubes, will fill out the winter
ration satisfactorily. The fodder can be fed as it comes
from the shock, or chopped or shredded.

Several kinds of silage are now used in Nebraska. Corn
silage and sweet sorghum silage are the most
common and satisfactory. Tonnage is generally high per
acre, the crop is fairly mature when cut, and there may
be considerable grain in the feed. Some stockmen like
a mixture of corn and sorghum better than either one al-
one. Grass silages and legume silage has been made
from grass mixtures, small grains, alfalfa and clover,
and from weeds and damaged crops. These crops are
either wilted or a preservative is added to make silage.
High moisture content and offensive smell of the silage
have been problems of getting good feed. The grass
silage generally has no grain in it and is therefore not
as complete a feed as top quality corn silage. Dry rough-
age or concentrates should be fed with grass silage.
Because of the moisture in silage, it takes three pounds
of good silage to equal one pound of good hay for cattle.

Dehydrated alfalfa is a common product of the mills
in Nebraska. It goes into commercial feed mixes to
supply carotene and protein and other parts of good
rations. The cost is usually high in comparison with that
of high quality, home-grown alfalfa hay.

Grains and Concentrates

In studying grains for cattle, you logically begin
with corn, Nebraska's most common crop. It is very
palatable and high in carbohydrates which fatten animals.
Corn is not high in protein compared with some other
grains and the oil meals. New, yellow corn, produced
on fertile soil, is a fair source of Vitamin A and the
feeding qualities that keep livestock in thrifty condition.
Corn can be fed as shelled whole corn, as cracked shelled
corn, or as ground corn and cob meal. It should not be
ground to powder for cattle since they prefer coarsely
cracked or whole kernels to the fine meal.

Oats are excellent feed for calves and breeding
stock. They are well balanced between protein and carbo-
ydrate content and are bulky enough to make good cattle
feed. Stockmen say their calves "do well" on oats,
meaning that the oats seem to be ideal for the digestive
system of the cattle. Oats can be fed whole, cracked,
or rolled, alone or in mixtures with other grains.
Barley has some of the fattening qualities of corn and some of the bulkiness of oats, and makes a good feed for cattle when mixed with other grains. The kernels are hard and should be cracked, rolled, or cooked. Some showmen like cooked barley for show cattle. Barley puts a smoother, more mellow finish on fat beeves than corn, and is higher in protein than corn.

Grain sorghum makes a good cattle feed when coarsely cracked and mixed with other grains. It is lacking in vitamins, and it goes through cattle undigested when fed without grinding.

Wheat is quite doughy and not a good cattle feed alone. They do not like it. A limited amount can be coarsely cracked and mixed with other grains or scattered over silage. It is high in protein and digestive nutrients compared with other grains.

Rye, if coarsely ground, is a fairly satisfactory cattle feed when mixed with other grains. It should be of good quality and free from ergot.

Dried beet pulp is a bulky feed about equal to corn in feeding value. Some feeders believe it helps prevent bloat in fattening rations, and it seems to help the digestive processes. Not over one-fifth of the total grain ration should be beet pulp. Price per pound and availability generally regulates the amount used.

Molasses is a good appetizer with about 90% the feeding value of corn. It is often included in commercial feeds in limited amounts. Liquid molasses is hard to feed, and dried molasses is too high in cost to be used to any great extent.

Wheat bran comes from the outside hull of wheat, contains 15% or more protein and some desirable minerals. It adds bulk to a ration, is a good body conditioner, and mixes well with corn and grain sorghum and wheat to make a good ration.

Gluten feed is a by-product of the corn milling industry. It is palatable, easily digested, fairly high in protein, and a good feed for cattle.

Three oil meals are commonly on the market, and there are many mixtures of them and other feeds in commercial protein concentrates. Soybean oil meal is probably the most common in Nebraska, and generally the lowest in price per pound of protein in it. It is not as high in phosphorus as the other two oil meals. Linseed oil meal, while not testing as high in percentage of protein as soybean and cottonseed meal, seems to be about equal to the other two pound for pound. It does have a laxative effect on cattle and tends to put a bloom on the hair coat that is not noticed from the other oil meals. Linseed meal sometimes gets rancid in hot weather. Cottonseed oil meal is about like soybean meal in protein content, higher in phosphorus and lower in calcium. It is slightly constipating in its effect.

Meditextures of the oil meals in cake and cube form are available from commercial feed manufacturers. In research tests cattle seem to do as well on one kind of oil meal as on a combination of them. When you buy any protein supplement, you should figure how much the protein in the feed or mixture costs. Pellets and cubes may be easier to feed in winter than meal. Adding meat scrap may increase the palatability of the protein supplement and add some helpful vitamins and minerals.

Dried skim milk is high in protein and vitamins and other feeding qualities that are good for young animals. It is generally higher in cost per pound of protein than the other two oil meals, and it is not very palatable. More than 10% of dried skim milk in the grain mixture will lower the palatability of the mixture for most cattle.

Urea is a synthetic compound obtained from the nitrogen in the air. It contains as much nitrogen as if it had 262 per cent protein. In other words, one pound of urea has as much protein in it as about six pounds of soybean meal. When urea is mixed very thoroughly with corn or similar low protein, high starch concentrates, and not over 2 or 3 per cent of the mixture is urea, it can be fed with good results to beef cattle. Feeding urea without grain in a wintering ration, failing to mix it well, or using more than 3 per cent in the mixture has given poor results and has caused poisoning and even death in beef cattle.

Breeding, Calving, and Management Practices

While some club members may have beef breeding heifers just to enjoy the 4-H club experiences and learn about cattle, most of you will be keeping the heifers to breed them and produce good beef calves for a breeding herd and for meat. You will want to make some money while you are at it. Some of you may become the leading livestock breeders of your generation.

Getting your heifer bred at the right time to the right bull deserves a lot of study and planning. Try hard to avoid accidental breeding to a poor bull at too early an age. Use the best beef type bull you can, and a purebred, registered one if available.

Most purebred breeders will help a club member by loaning the service of a bull, especially if the club member has purchased a heifer from that breeder. Some would be willing to help the club member regardless of where he bought his heifer. The breeder would probably require you to furnish a health certificate and would want the heifer left at his farm until she had passed two or three heat periods after being serviced. You should pay the feed bill and a reasonable service fee if the breeder asks a breeding fee. It might be well to arrive at some understanding on breeding privileges with the owner before buying the heifer. Even where you buy a heifer at public auction, you might ask the owner of the heifer if he would give a breeding privilege to one of his herd sires in case you bought the heifer.

Your heifer will start coming in heat sometime after she is six months old, and repeat every three weeks until she is bred. When she should calve depends upon her growth and maturity, and to some extent on the season of the year. Stockmen generally prefer to have their calves born early in the spring. Second choice is in the fall. The hottest part of the summer and the coldest part of the winter are not good calving seasons. If you start with a calf born early in the spring, and feed her well so she develops into a big growthy heifer, you can breed her when 15-18 months old, to calve just after she is two years old. Then you will have to feed her well the first year because she is still growing and is shedding baby teeth and getting permanent teeth while nursing the first calf. It might be safer to wait until she is about 21 months old to breed her to calve at 30 months of age.
### Analyses of Common Cattle Feeds

<table>
<thead>
<tr>
<th>Feed</th>
<th>Total % Digestible Nutrients</th>
<th>Protein %</th>
<th>Fiber %</th>
<th>Calcium %</th>
<th>Phosphorus %</th>
<th>Carotene Mg/lb.</th>
<th>Vitamin A IU/lb.</th>
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<tr>
<td>Alfalfa hay</td>
<td>50.3</td>
<td>14.8</td>
<td>28.9</td>
<td>1.47</td>
<td>0.24</td>
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<td>Corn stover</td>
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<td>Prairie hay</td>
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<td>Sorghum fodder</td>
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<tr>
<td>Corn silage</td>
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<td>2.2</td>
<td>6.7</td>
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<td>0.06</td>
<td>6.4</td>
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<td>Barley</td>
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<td>Beet pulp</td>
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<td>Bonemeal</td>
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<td>Corn &amp; cob</td>
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<td>Corn gluten</td>
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<td>Cottonseed meal</td>
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<tr>
<td>Grain sorghum</td>
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<td>10.9</td>
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<td>0.02</td>
<td>0.31</td>
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<td>Linseed meal</td>
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<td>Molasses</td>
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<td>Oats</td>
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<td>Skim milk, dried</td>
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<td>34.7</td>
<td>0.2</td>
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<td>1.03</td>
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<td>-</td>
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<tr>
<td>Soybean meal</td>
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<td>44.6</td>
<td>5.8</td>
<td>0.30</td>
<td>0.67</td>
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<td>150</td>
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<tr>
<td>Wheat</td>
<td>79.6</td>
<td>13.5</td>
<td>2.8</td>
<td>-</td>
<td>-</td>
<td>.04</td>
<td>67</td>
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<tr>
<td>Wheat bran</td>
<td>67.2</td>
<td>16.9</td>
<td>9.6</td>
<td>0.14</td>
<td>1.29</td>
<td>.08</td>
<td>133</td>
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</table>
That will give you a fall calf, and you can grow out the calf and cow together that winter on good roughage and grain.

A cow calves about 283 days after being bred. You should write down the breeding date where it will not be lost, then watch the heifer closely three weeks and six weeks from that breeding date to see if she come in heat again. If she does, breed her again and record. the second service. The last 10 per cent may be difficult to breed or non-breeders. A veterinarian can sometimes help when there is serious trouble.

Most beef heifers and cows are bred naturally to beef bulls. It is possible to get semen from bull studs and breed artificially. Some purebred beef cattlemen have used artificial insemination to extend the use of outstanding herd sires in their own herds. The purebred registry associations will accept applications for registration of calves from such breeding, but not when the semen is obtained from a bull stud. If no beef bull is available for your first heifer, and you are not concerned with registering the calf, you might try the service of your nearest bull stud. Breeding a heifer of one beef breed to a bull of another beef breed may result in a growthy feeder calf, but there is no point in crossbreeding if you intend to build up a breeding herd.

Should you have a choice between herd sires of different types, choose the one that will produce big growthy calves of reasonably good type rather than the one that sires calves that are extremely refined and smooth but never very heavy. Many studies are now being made at research stations and by cattle breeders to measure the ability of cattle to reproduce growthy, rugged calves that put on a lot of pounds of beef. If you can avoid, breeding your heifer to a bull that produces dwarf calves. Dwarfs are born when both the sire and dam carry the genes of dwarfism. They are not profitable cattle.

During the nine months between breeding time and calving, your heifer should be fed lots of roughage and good pasture in season, and only a little grain to keep her in good condition but not too fat. If she is healthy, she will put on a little extra covering of meat and fat to be used when she is nursing her calf. Handling her in a quiet manner, halter breaking her if you want to do it, or at least making her feel that you are not going to hurt her in the yard and stalls, will help you to handle her easily at calving time if that is necessary.

If she is to drop her first calf in the spring or fall when the weather is unfavorable allowing her to calve outside on pasture will probably be just as good as trying to keep her in a stall. If the weather is not favorable, you can put her in a big box stall for two weeks or more before she is due to calve. Putting her in at night may be enough if someone is around the buildings doing chores during the day. The stall should be well bedded with clean straw.

The heifer's udder will fill, her teats will be tight, and hollow places will form by her pinbones on each side of her tail during the last few hours before she calves. She may become restless and a little worried and lie down and get up often just before the calf comes. If the birth is natural, the calf's front feet will appear first, and its nose will be between the forelegs. When the head has passed through the smallest part of the heifer's pelvic bones, the calf is generally dropped quickly while the heifer is standing. The navel cord breaks and the calf must begin to breath air quickly or die. You can wipe away the film from the calf's mouth and nose to help it get a good start in the world. You can also paint the navel with iodine to avoid infection. The calf should start to move within a very few minutes, and the mother will usually want to lick it dry. Within an hour it should be struggling to get on its feet to find something to suck. You may be able to help it find its first meal of colostrum milk from its mother. This milk is high in vitamins and has a definite effect on the digestive system of the new calf. Without it, the calf would probably not live.

Sometimes, birth does not happen so easily. A calf may be lying in the womb in the wrong position and come hind feet first, or with front feet doubled back, or occasionally some other way. An experienced cow man or a veterinarian may be able to push the calf back and get it started correctly, or to help pull it as the cow strains in her labor pains. Small, poorly developed cows, or cows on a poorly balanced ration and in poor health, may be too small or weak to give birth to the calves they develop. There is no substitute for strength and vigor and health at this time.

A deformed calf is born occasionally. Some are worth saving, others are not. If you are so unfortunate, try again. If the calf is weak and will not get on its feet to suck in three or four hours, milk some of the colostrum milk from the cow if you can, and feed it to the calf with a nipple pail or bottle. Just a few swallows may be enough to bring the calf out of its daze and put it on its feet. If the young heifer is too excited to lick the calf dry, and the weather is cold, dry it yourself with sacks or cloths, or take it into a heated room for a few hours. Once it is dry and hungry, then well fed, it can take a lot of cold as long as it stays dry.
If your calf will have horns, and you want to take them off, the best time to do it is when the calf is a week to three weeks old. Feel the poll to find out when the horn buttons begin to grow. When the bumps stick out about a quarter inch, and before the horn breaks through the skin, you should apply one of the caustic dehorning compounds as directed in the container in which you buy it. Watch the calf for about an hour to keep it from rubbing the caustic off on its feet or across its cheeks. While the caustic is burning, the calf will do everything it can to scratch it off. A scab will form over each burn which should come off naturally in from six to ten weeks leaving a nice, smooth poll. If not enough caustic is used, a stub horn may grow. It can be clipped or sawed off later if necessary.

Your young cow may give more milk than the calf will take. If she is gentle enough you should milk out some of the milk to help take down the swelling and fever and caked condition. Ordinarily she will hold back enough for the calf regardless of how hard you try to get it all, and the calf will help draw out the inflammation from her udder. She will adjust her milk flow to what the calf needs in a few days. Wheat bran and oats are good, cooling feeds for her at calving time.

When too much gas forms in the process and the liquid accumulates, the cow or calf bloats and the left side of the body swells up tight. Let the accumulated gas out through the opening in the hide at the point in front of the hipbone and back of the last rib where the hide will usually be the tightest. Let the accumulated gas out through the opening rather slowly. You will have punctured not only the hide but the stomach wall too. When the pressure has been relieved and the animal seems to be back to normal, remove the trocar cannula or knife and paint the wound with merthiolate to help avoid infection. Change of feed will generally avoid repetition of the trouble, although some cattle are chronic bloaters. They generally do not do very well and probably should go to market.

When your calf is four to eight months old, it should be vaccinated by a veterinarian for Bang's disease and blackleg. These can be done at the same time. The Bang's vaccination will probably cause the calf to run a temperature for a few hours about the second to third day. She should be kept in a dry place if the weather is wet and cold. She may be a little stiff and a lump may come where the vaccine was inserted, but she should recover within a week.

Cavies are branded each year on ranches in the branding area of the state, but this is not a common practice on farms where small herds are kept. Tattoo marks in the ears are a very permanent means of identification. Ear tags are practical, except that calves sometimes lose them. Neck chains with large numbers are handy, but need adjusting as the calves grow. If you do not have many cattle on the place and you see them often, you can generally tell them apart until weaning time or later when other marks of identification can be used if necessary.

Working with the herd some, getting the calves started on hay and grain, moving the cows and calves into winter quarters together, will all help shorten the bawling period at weaning time.

### Digestive Troubles, Diseases, and Parasites

Even though we would like to think about enjoying the cattle business without a bit of trouble, that would not be true to life. Compared with some other animals, cattle are strong and healthy and able to take care of themselves fairly well.

Many good management practices can be followed to avoid difficulties, but when they do occur a competent veterinarian is needed. He should be called in time to do some good, not as a last resort.

**Bloat.** Digestion of feed in the four stomachs of a ruminant like the cow is a complicated process. A lot of coarse roughage is converted into energy and meat and milk. The cow belches up most of this roughage and chews her cud. Bacteria perform miracles of digestion. When too much gas forms in the process and the liquid in the paunch rises above the opening from the throat, the cow or calf bloats and the left side of the body swells up tight. If the bloat is not very serious, you may be able to help by putting a big rope or stick in the animal's mouth to help her belch, by standing her with her front feet about a foot higher than her hind feet, by walking her around for a few minutes, or by running a smooth hose down her throat to let the gas out. Giving her a pint or more of mineral oil or raw linseed oil may help. If she is bloat ed so much that she stands stiff-legged or her eyes begin to glass over, get the veterinarian quickly, or tap her left side with a trocar or big knife, sticking it through the hide at the point in front of the hipbone and back of the last rib where the hide will usually be the tightest. Let the accumulated gas out through the opening rather slowly. You will have punctured not only the hide but the stomach wall too. When the pressure has been relieved and the animal seems to be back to normal, remove the trocar cannula or knife and paint the wound with merthiolate to help avoid infection. Change of feed will generally avoid repetition of the trouble, although some cattle are chronic bloaters. They generally do not do very well and probably should go to market.

**Scours.** Irregular feeding, dirty troughs and pails and water, and certain germs can cause diarrhea or scours in cattle. The bowel movements can be distinguished by the color and odor from those caused by new grass or too much grain. White scours, which may begin soon after the calf is born, are thought to be associated with infection through the navel cord. Treatment of the navel with iodine immediately after birth is a common preventive measure. Several of the new antibiotic drugs have been used successfully by veterinarians, and compounds are on the market which the advertisers claim will control white scours. Bloody scours are generally due to coccidiosis caused by germs picked up in feed or water. This trouble is most common in wet seasons when the calves drink out of puddles around the lots. Some of the sulfa drugs have been used successfully, but the best prevention is clean feed and water. Too much milk, particularly when you feed out of a bucket, is a common cause of scours. Reduce the amount to none for a day or two, then give the calf just a little. Adding raw eggs may help. Clean pails and warm milk will help avoid the trouble. Clean the feed troughs well before each feed. Provide plenty of dry bedding. Get lots of sunshine into the pen or change the calves to pens where there is plenty of sunshine. Moving to new quarters not used by calves before may be the most practical solution. Certainly, putting new-born calves into pens where others have had scours is just inviting more trouble. Keeping a calf healthy is much more profitable than curing him after he is sick.

**Impaction of the digestive tract occurs occasionally when the feed is dry and coarse and the cattle do not or cannot drink as much as they should. It is often associated with a poorly balanced ration that may be lacking in vitamins and minerals. Plenty of water to drink, salt and bonemeal available all the time, some linseed oil meal and green leafy alfalfa hay or high quality silage in the ration will usually avoid the trouble.**
"Hardware" disease is a common term used to indicate that a cow has swallowed some metal with her feed and it has lodged somewhere in her body where it might cause death. A nail or wire or any other indigestible object will settle to the bottom of the small stomachs, and then may pierce through the wall and into the lungs or heart. About the only remedy is for a veterinarian to operate and remove the metal. You can help avoid the trouble by picking up nails, wire, and similar objects before the cattle do and by keeping such foreign material out of the grain and hay.

Warts are quite common on calves and yearlings. They are caused by a virus which is infectious. Serious cases are unsightly and painful but not fatal. Smothering the warts with sweet oil or castor oil and iodine helps remove them. Vaccines are available. As the calf matures the warts will disappear regardless of treatment.

Ringworm is caused by a parasite that gets into the skin. A rough skin condition will develop, the hair will drop out in a ring, and the condition will spread outward from the ring. Scrub off the scaly skin and paint the area well with iodine. Add a little glycerin to the iodine to help heal the skin. Ringworm is worst in late spring months and generally disappears during the summer. You can get ringworm on your skin by handling calves with ringworm.

Pinkeye is most common in late summer and fall. Eyelids are partly closed, the eyes water down over the cheeks and in severe cases become cloudy and glassy and even blind. Put the infected cattle in darkened stalls if possible where flies will not bother them. Wash the eyes with boric acid solution to clean the eyelids. No preventive measure is known.

Lumpy jaw is caused by fungus of two or more kinds. One type causes an enlargement of the bones and little if anything can be done to prevent or cure it. Another type develops enlarged soft tissue in the throat or under the jaw. A veterinarian can successfully treat this type if he is called early in its development.

Blackleg is an infectious disease of young cattle. They show lameness, run a high temperature, and gas forms under the skin so a crackling sound can be heard when you rub your hand over their legs and shoulders. They live only a short time. There is no cure. Opening the hide will show the characteristic dark flesh, particularly on the legs. Dead animals should be burned. Fortunately, blackleg bacterin is one of the most perfect vaccines in veterinary medicine, and vaccinating before the calves go on pasture each spring is a certain way to avoid the trouble.

Brucellosis is an infectious disease often called Bang's disease or contagious abortion. It causes premature birth of the calf. Brucellosis is spread through feed and water and by direct contact. It can be reduced greatly, if not completely controlled, by vaccinating all young females at four to eight months of age and replacing older females with vaccinated ones in due time, and by a careful management and sanitation program to avoid spreading the disease at calving time. Men who handle diseased cattle can contract undulant fever from them.

Diphtheria is an infection of the lips, tongue, and mouth which causes swelling of the face and throat and difficulty in swallowing. Veterinarians have treated it successfully.

Anthrax is a contagious disease more often affecting older cattle on pasture. It can be transmitted to man and is usually fatal. The spore of the germ can live in the soil a long time. The disease usually acts quickly. Dead animals should be burned where they die and the premises cleaned and infected. Healthy animals can be vaccinated.

Shipping fever or hemorrhagic septicemia is a type of pneumonia associated with movement and disturbance of cattle. Some men advocate vaccination two weeks before a shipment is to be made, but there is no proof that it is effective. Sensible management in shipments and isolation and rest in a dry, draft-free place after arrival will do much to avoid trouble. Oats, wheat bran, bright green hay, and warm sunshine are all good tonics for tired, scared cattle. Affected cattle should be treated by a veterinarian.

Footrot causes swelling and redness of the skin just above the hoof and between the toes. Clean off the dirt and dead tissue and soak the foot in a 10% solution of copper sulphate (a poison) every day for about a week. You will need a heavy bucket to put the foot into. Clean up manure and drain out wet spots around the lots. Keep the calf in a clean, well-bedded stall or on dry, clean pasture.

Cattle grubs come from eggs laid by a heel fly on the hairs of the legs and heels. The eggs hatch and the small larvae burrow through the tissues of the body until they reach the back between the hooks and shoulders where they continue to grow until the next spring. They make a hole through the hide of the back to breathe. When they are mature, they come out of this opening and drop to the ground to become pupae and then more flies. Damage to the hide is only one loss. The others are less growth on young animals and loss of weight on mature cattle. If you have had grubs in your cattle on the farm or ranch, or have bought new cattle during the past year, rub your hands over their backs about every two weeks beginning about the first of the year. If you feel bumps indicating grubs under the hide, dust the cattle with 5% rotenone powder and rub it in well, or spray the cattle. Two or more treatments will be best, the first one about the last of January and the others at two or three week intervals.

Lice will multiply in the winter and cause severe itching in the early spring. They do not bother much in the summer and early fall. Two kinds of blue lice suck blood, a third kind is reddish yellow and bites the skin. Getting rid of lice should start in the fall with two sprays 16 to 20 days apart. Mix two ounces of wettable DDT powder in three gallons of water and wet the calf well with it. An ounce of 5% rotenone in three gallons of water can also be used. In cold weather, dusting with 5% rotenone powder will be effective if the lice are reached with the dust. If biting lice work on the tail, they may cause the switch to drop off. Soak the switch and end of the tail bone in the DDT or rotenone mixture every two weeks until the skin has become smooth and normal again.

Horn flies are the small ones that come early in the spring and cluster around the horns and over the backs of the cattle. They breed in manure droppings of cattle on pasture as well as around the buildings. Latest and most effective controls are being obtained with back rubbers made of chain covered with burlap and soaked with the fly killers. The cattle walk under the chain and burlap and oil themselves. How to make the rubbers and what to use on them to control the flies is described in an Extension Circular, EC 1568, Horn Fly Control. Commercially built rubbers are also on the market. Most of them work automatically.
Stable flies are the biting ones that draw blood out of livestock. They are most commonly found on the legs but will feed on any part of the body. When they are not feeding, they rest on grass, weeds, trees, fences, or buildings. They breed mostly in rotting manure and wet rotted hay and other roughage. Best control can be obtained by cleaning up all the possible breeding places, and then spraying at frequent intervals with DDT and the related compounds. None of these preparations has been very effective, however, on stable flies.

While house flies do not bite like horn flies and stable flies, they can tantalize cattle around the eyes and mouth and they may help carry disease. Several chemicals have been used fairly effectively but the house flies seem to build up resistant strains and keep up the population. Some of the latest developments have been poisons to spread on the floor and other places where flies crawl, and also the activated pyrethrums that kill the flies that are hit by the spray. Even though the chemical preparations have raised hopes for effective controls, there still seems to be no substitute for cleanliness around the buildings and yards. Removing the breeding places early in the season reduces the multiplication rate for the year.

Lead poisoning is serious when cattle lick paint from discarded paint cans or from the side of a newly painted building or fence. Keeping them away from the paint is the practical way to avoid such a loss.

Fitting and Showing Breeding Heifers

As a typical 4-H club member, you will probably want to take your breeding heifer to the fair to win a ribbon and premium. It is an experience that many boys and girls enjoy. Showing a breeding heifer, however, present some problems that are not serious with fat beefes.

Some breeders of registered cattle put a show herd on the fair circuit each year. They get their animals so fat they can hardly walk. While it would seem that standards of beef cattle judging would recognize body conformation, breed type, and character more than finish, the fact remains that the high degree of bloom and finish are very attractive in the showing to both the judges and the ringside audience. Such fitting may jeopardize the future reproductive ability of cattle.

In Nebraska 4-H club work, a real effort is now being made to give credit to desirable beef conformation rather than extra finish in the local county and district shows where the competition is between local exhibitors. You should be happy in such company.

There is an old saying among cattlemen that a person cannot afford to fit a beef herd for only one or two shows. This applies to competition from professional show herds. If you want to win ribbons where these herds show, you should plan to make a season of it and try to learn all the fitting and showing practices you can from the showmen who take care of these herds.

Most of the things you need to learn about fitting a beef heifer are in Extension Circular 0-23-2, Fitting and Showing Meat Animals. If you want your calf to
develop a long, lustrous hair coat before show time, keep her out of the sun, and spray her each evening when you turn her out with a mist spray of cold rainwater. You can save the rainwater in a barrel or cistern. The first night or two, dampen the hair well and brush it upward from the belly to the back. Leave it roughed up. The next night, brush the hair up dry and then spray it softly with the soft rainwater. Repeat this hair treatment every evening until show time. You will be surprised how well you can cover up faults with a nice coat of fluffy hair. Do not blanket your heifer. Some Angus may not respond. They should be shown with the hair slicked down smooth.

Training and showing heifers is included in Extension Circular 0-23-2. As a prospective young livestock breeder, you have more to learn than if you were showing only market animals. One objective of showing breeding stock at fairs is to establish a reputation and obtain a market for your surplus breeding stock. You should observe how the professional showmen treat fair visitors when they come through the barns. They have their exhibit in top shape. Everything is clean and orderly. No matter how busy they may be, they take time to answer all kinds of questions from city folks as well as prospective buyers. They seldom cramp or criticize the show, the judge, or their competitors before the guests of the fair. They try to sell themselves as well as their cattle.

Marketing Beef Cattle

As a breeder of beef cattle, you should be thinking about selling them at a profit either as breeding stock or as commercial cattle. In the chapter about selecting your first calf or older animal, you read about starting with one from your home place, one from a neighbor, one from a cattle breeder farther away, or one from an auction sale. We mentioned prices in line with the current beef cattle market or the prices you might pay for purebred stock. Buying right is one of the first steps in good marketing. This is particularly true if you start with grade stock.

Even if you paid a premium for a registered calf, you should get your money back eventually in selling breeding stock or in the quality of the commercial market cattle you produce. It may be hard for you to sell your surplus as breeding stock at the same price you paid for your calf from a well known breeder. You have not established the reputation he has, nor would buyers have the confidence in you that they have in him. That is what you must earn in your own right as you get more years of experience. Getting $10 more per head on several calves may return the extra amount you paid for your first calf.

If your first registered heifer develops into a good brood cow, she may have up to ten calves for you, about half of which will be heifers. You may want to keep all of them, but sell the bulls either as breeding bulls or as steer calves or fat steers. One of the most promising young bulls might become the herd sire for the rest of the farm or ranch herd. Some of the steer calves, and any heifers you do not want to keep for breeding stock, might be fed out as 4-H beeves. You should get added satisfaction if you are successful with fat beeves of your own breeding.

Well-bred grade calves can also be marketed through 4-H projects or they can be fed and sent to market as veal calves or as feeder cattle or fat beeves. The feed supply on your place and the time you have to spend are two governing factors every year. Guessing whether the fat cattle market will go up or down while you feed out a calf or a load is an interesting game. Year after year, good cattle raisers and feeders are paid for their feed and work. What they may lose one year, they make back other years.

Market Grades. At the time this manual was being prepared, there was a range in market grades of cattle at $18.00 per hundredweight from top prime to low canners. Sometimes, the spread between the best and poorest grades is greater and sometimes it is less than $19.00. Market prices can change up or down according to the power of buyers or sellers to move prices.

The official market grades of beef cattle are: prime, choice, good, commercial, utility, cutter and canner. A copy of the description of "Official United States Standards for Grades of Slaughter Cattle" may be obtained from the Agricultural Marketing Service of the United States Department of Agriculture in Washington, D.C. All breeders and feeders should be familiar with these grades. The grade, age and other factors have a big influence on the rate of gain and cost of feeding as well as the selling price and profits.

Market grades are usually quoted in papers and on the radio in terms of ranges for different classes such as:

<table>
<thead>
<tr>
<th>Present Listing in Livestock Papers</th>
<th>Price per cwt.</th>
<th>Corresponding Official Grades</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Choice to prime</td>
<td>$23-27</td>
<td>Prime and choice</td>
</tr>
<tr>
<td>2. Good to choice</td>
<td>21-23</td>
<td>Good</td>
</tr>
<tr>
<td>3. Fair to good</td>
<td>17-21</td>
<td>Commercial</td>
</tr>
<tr>
<td>4. Common to fair</td>
<td>14-17</td>
<td>Utility</td>
</tr>
<tr>
<td>5. Trashy</td>
<td>8-14</td>
<td>Cutters and canners</td>
</tr>
</tbody>
</table>

The range means the difference between the low and high quotation. Quotation means the price reported where buyers and sellers agree to buy and sell. It is obvious that there is a difference in price within each grade as between grade from prime to canners.

Selling practices. You should carefully consider the type of market in which the livestock will be sold because it may have a direct influence on the price and services. There is usually some choice in the kind of market you can use, such as:

(1) Sale to an individual
(2) Local buyers
(3) Central livestock markets
(4) Local established auction
(5) Special arranged auction or purebred sale

...
The simplest way to sell, of course, is to find a local friend, farmer or breeder with whom you can begin price negotiations. Price negotiations mean that you can begin your bargaining activity with the buyer. Determine as best you can from market reports and people who know the fair value of your livestock and offer them for sale at that price.

There are over 100 livestock auction barns or markets licensed in Nebraska where regular sales are made. It is very important to have many buyers bidding actively against one another to get the highest prices. It is the job of the auctioneer and his assistants to find the highest bidder.

Select your market carefully—choose on the basis of well qualified salesmen who are well trained and in whom you have confidence. Try to sell where you find a maximum of competition among buyers to help assure maximum fair prices.

The public central livestock market is the most highly organized. On this market the commission firm you choose to sell your livestock becomes your agent. Its men use their skill and training to get the best price they can. They are bonded for your protection and depend on the fee they charge you to provide their income.

When you buy or sell a car, a suit, or livestock, the best policy is to do business with those in whom you have confidence. Those producers who buy and sell a lot of livestock generally keep up to date on values.

Most people do not have this opportunity and must depend on well qualified experts in the field to represent them when buying or selling.

<table>
<thead>
<tr>
<th>Gain</th>
<th>400-lb Calf</th>
<th>640-lb. Yearling</th>
<th>840-lb. 2-year-old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corn $1.10</td>
<td>Corn $1.10</td>
<td>Corn $1.10</td>
</tr>
<tr>
<td></td>
<td>$1.50</td>
<td>$1.50</td>
<td>$1.50</td>
</tr>
<tr>
<td>1st 100 lbs.</td>
<td>$9.57</td>
<td>$11.55</td>
<td>$11.77</td>
</tr>
<tr>
<td>2nd 100 lbs.</td>
<td>$10.67</td>
<td>$13.53</td>
<td>$14.41</td>
</tr>
<tr>
<td>3rd 100 lbs.</td>
<td>$11.99</td>
<td>$15.73</td>
<td>$18.48</td>
</tr>
<tr>
<td>4th 100 lbs.</td>
<td>$13.64</td>
<td>$19.25</td>
<td>$25.74</td>
</tr>
<tr>
<td>5th 100 lbs.</td>
<td>$17.16</td>
<td>$24.64</td>
<td>$(17.93)</td>
</tr>
<tr>
<td>6th 100 lbs.</td>
<td>$19.14</td>
<td>$32.10</td>
<td>$(25.45)</td>
</tr>
<tr>
<td>7th 100 lbs.</td>
<td>$24.09</td>
<td>$32.85</td>
<td>* For 50 lbs. gain</td>
</tr>
</tbody>
</table>

Cost of gain go up as cattle put on more pounds of finish. Use cost of gains as well as margins in deciding when cattle should be marketed.

Generally speaking, the more pounds you can put on by natural growth on good mothers, good pasture, common farm roughage, and home grown grain, the more net profit you will have for your work. The last pounds of finish on fat beeves come slowly and are expensive. An important thing to remember is to not feed the animal beyond the point where it costs more for the gain than you can recover in the sale price. The table above shows that as the feeder gets older and heavier the cost of adding weight increases.