

Beef Production for Small Farms

Beef production is a large and important segment of American agriculture as well as one of the largest industries in the world. In the United States, beef is the preferred meat.

About two-thirds of the beef cows in the U.S. are in herds of fewer than 100 cows, and nearly one-half are in herds of fewer than 50 cows. Many beef herds are maintained in conjunction with some other enterprise. A well-managed small-scale beef enterprise might be more profitable than a large operation that is not well-managed. Even a part-time cattle enterprise can be profitable.



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Beef enterprises work well with grain, orchard, vegetable crops, or other operations. Cattle can make efficient use of feed resources that have little alternative use such as crop residues, marginal cropland, and untillable land or rangeland that cannot produce crops other than grass. Many people who own land but work full-time off the farm find that a beef enterprise is often the least labor-intensive way to utilize their land.

A cattle enterprise can make use of family or surplus labor. Work such as calving, weaning, vaccinations, castration, and weighing can be planned at times when labor is available.

A small-scale beef operation works best with enterprises that provide a more regular income. This is because a beef operation may provide income only once a year. If a breeding herd is established it may take several years before initial costs are returned, due to the slow turnover rate.

When contemplating a beef operation, decide how regular and how soon income must be derived, and if cattle must be a major source of income. Possibly the main purpose of cattle could be to serve as a means of increasing income from surplus feed and labor resources. Your

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interest, resources, and the land available are factors to consider before making a decision to engage in the cattle business.

Some of the Options

There are several types of small-scale cattle enterprises; however they are generally grouped into the broad areas of growing and feeding, breeding herds, and combinations of these.

Growing and feeding

Growing and feeding options are discussed in the following examples:

- A *steer or heifer feeding operation*, in which calves or yearlings are fed all the way to slaughter time. Included in this category are those operations specializing in producing locker beef for local buyers. This operation may not require much land, but a shed and lot or corral are essential so that animals can be kept comfortable and under control.

If 350- to 600-pound feeder calves are purchased after weaning at approximately 7 to 10 months of age, they can be fed out and marketed in less than a year from time of purchase. This means the investment on each calf is returned within a comparatively short time.

- A *"stocker" operation*, in which weaned calves are pastured or fed a roughage ration from weaning until they reach 650 to 750 pounds, when they might be sold to a feeder for finishing. Some excellent enterprises consist solely of a pasture operation, with weaned calves or yearlings purchased to go on pasture when the grass is ready and sold when the pasture season is over. Generally calves cost \$2 to \$5 per hundredweight (cwt) less in the fall than in the spring, so if hay is available for wintering, the fall may be the best time to purchase cattle to graze during the next pasture season.

- A *"backgrounding" operation*, in which weaned calves or light yearlings are put into a lot and warmed up on a light grain ration before going to a feeder for finishing. Backgrounding teaches calves to eat and drink in a feedlot.

In these calf and yearling enterprises, purchase price and selling price greatly influence profitability. It might be well to ask an experienced order buyer to assist in purchasing animals that will best suit the purpose.

Breeding herd

Establishing a breeding herd is a long-range program, and benefit probably will not be realized for 2 or more years. Developing a herd of breeding cattle requires much more land than a simple steer or heifer feeding program. Consider how the available resources match the long-term objectives. There must be adequate feed, water, and fences to accommodate a year-round operation.

When developing a breeding herd decide whether to have registered purebred cattle or commercial cattle. Care and management of registered cattle is more intensive than for commercial cattle. Income from a commercial beef cow herd comes mainly from the sale of calves and old or cull animals. Sale of breeding stock is the main source of income from registered cattle.

If the objective is to raise registered cattle and supply breeding animals, mostly bulls, to other breeders, it will be necessary to make large capital investments in seedstock. Development of a registered herd means that both the

sire and dam are within the same breed association. Those who raise bulls for the beef industry must develop a selection program based on characteristics of economic importance such as fertility, mothering ability, ease of calving, growth rate, and carcass merit. To develop such a herd it is necessary to keep accurate records and register the desirable purebred calves to be retained for breeding stock. These might be used as herd replacements or sold to other operators with beef herds.

There is a need for top seedstock producers. The competition is keen with already well-established herds; however, there are successful registered herds running only 30 to 50 cows.

Since much time and considerable expense is involved, use great care in the selection of foundation breeding females. There are many sources of good cattle, both registered and commercial. Usually, it is best to purchase from a successful and reputable breeder. Most well-established breeders will sell only sound cattle as breeding animals, and will be helpful in giving advice to less experienced operators.

The objective of most commercial producers is to raise calves that eventually will be fed out for the beef market. The commercial operator also must have a selection and culling program to develop a top-producing herd. These herds can be straightbred or crossbred, depending on the desires of each producer.

When feeder calves are selling from 60 to 80 cents per pound, good commercial cows sell from about \$500 to \$700, depending on size, quality, age, condition, and stage of pregnancy. Cows with small calves at side usually sell for an additional \$100 to \$150.

If management and time spent with a commercial cow herd is going to be minimal, it is usually considered that cows of the traditional British breeds such as Hereford, Angus, Shorthorn, or crosses of these will work best. Usually these cattle are a little easier to take care of than the larger, Continental breeds. The larger cattle require more feed and may not do as well under marginal conditions. If the small-herd owner has had considerable experience, these breed and type differences may be used to advantage in a crossing program.

It might be best for the inexperienced to buy good, young bred cows that have calved. This reduces the problems associated with calving out heifers with their first calf. If open heifers are purchased they should be bred to a small-framed bull.

Combinations of breeding, growing, and feeding

Most calves produced in small commercial herds are marketed as weaner calves weighing from 350 to 600 pounds, although some producers wean the calves, winter them, and sell them as yearlings. Some successful operators creep feed calves while the animals are still on their mothers, put them on full feed after weaning, and then sell them as slaughter cattle at 12 to 16 months of age. Other operators may wean their calves, winter them on a growing ration, then graze the calves during spring and early summer and finish them to slaughter weight at 18 to 24 months of age.

Economics

Annual costs of maintaining a small, commercial beef herd will average from \$250 to \$350 per cow unit. Costs will vary depending on individual operations and types of expenses charged to the cattle enterprise. Some producers

may charge only variable costs such as feed, veterinary bills, fence maintenance, trucking, and interest on cattle and feed. Others may also charge fixed costs such as real estate taxes and depreciation on buildings and improvements. The figures used in the following example can be used as a guide in working out your own budget.

Trial Budget: For Estimating Cost And Returns For Your Beef Cow-Calf Enterprise

Based on:

1. 20 cows and 1 bull
2. 90 percent calf crop
3. 3 percent death loss of cows
4. 3 heifers kept for replacement

Receipts	Example	Your figures
Steer calves (9 head @ 450 lbs. @ 73¢)	\$2,970	\$ _____
Heifer calves (5 head @ 425 lbs. @ 66¢)	1,440	_____
Cull cows (3 head @ 1,000 lbs. @ 45¢)	1,350	_____
Cull bulls (0.3 head @ 1,400 lbs. @ 55¢)	231	_____
Total receipts	\$5,991	\$ _____
Expenses		
Hay fed (30 tons @ \$80)	\$2,400	\$ _____
Pasture use (160 aum's @ \$8.50)	1,360	_____
Salt and minerals	25	_____
Veterinary and medicine	65	_____
Bull purchase (0.3 head @ \$1,000)	300	_____
Fuel and oil	50	_____
Repair and maintenance	110	_____
Property taxes	110	_____
Insurance (liability, fire, theft, etc.)	20	_____
General overhead	90	_____
Interest (12%): Buildings & equipment (\$1,000)	120	_____
Cows (20 head @ \$500)	1,200	_____
Heifers (3 head @ \$425)	153	_____
Bulls (1 head @ \$800)	96	_____
Depreciation on buildings and equipment	150	_____
Operator's and family labor	600	_____
Total expenses	\$6,849	\$ _____
Return to Management	\$(-858)	\$ _____

Feeding Budget

When considering the economics of a small feeding operation add the purchase price per animal to the cost of feed and other expenses necessary to get each animal to market weight. For example:

Cost of steer, 500 lbs. @ 70¢/pound	\$350
A steer purchased November 1 and fed to a slaughter grade of low choice at 1,100 lbs. the following August 1 will eat about the following amounts:	
Rolled barley, 2,000 lbs. (1 ton)	135
Molasses dried beet pulp, 500 lbs. @ 6¢/lb.	30
Protein supplement, soybean or cottonseed meal, 200 lbs. @ 10¢/lb.	20
Hay, legume or grass legume, 15% protein, 1½ tons @ \$80/ton	120
Feed cost	\$305
Cost of steer and feed	\$655
Interest on steer, \$350 x 12% x 9 months	31
Interest on average feed investment, \$305 ÷ 2 x 12% x 9 month	14
	\$705.

The steer in this example would weigh about 1,100 pounds by August 1. It would have to sell for about 64 cents per pound to break even on just the feed, interest, and original purchase price. There may be other costs such as transportation, veterinary service, marketing, and death loss.

Many small beef operations use homegrown pasture and other feeds that help to lower feed costs. Less grain can be used if an animal is fed to grade USDA Good, which is slightly more lean than USDA Choice, and of course, the animal would weigh less than the steer in the example. Some consumers prefer to buy the leaner beef, especially for locker beef.

Total land requirements

If 20 cows were grazed on permanent pasture with a carrying capacity of 3 acres per cow during the grazing season, they would need 60 acres of grazing land. Three or four replacement heifers and the herd sire would require an additional 12 acres, so about 72 total acres of pasture would be needed. It will take about 24 acres of land to produce the necessary hay, so at this rate of production total land required is 96 acres.

If pastures are less productive, mostly brush covered or woodland, it is possible that more than 300 acres would be required to run this small herd. However, if the land is productive and intensively managed so that 1 acre would carry a cow-calf unit during the summer, and if the hay land produces 2 to 3 tons per acre, the herd could be run on about 60 acres of land.

There are examples of 20 cow-calf pairs, 4 yearling replacement heifers, and the herd bull being grazed successfully on 40 acres of pasture during a 7-month grazing season. On some of these small, part-time operations, hay is purchased for winter rather than attempting to raise it.

Yearlings, rather than cows, could be grazed on such acreages; however, there are the associated problems of purchase and sale. Usually two yearlings can be run in place of one cow-calf pair. If less land is available than is necessary for a cow herd, it is usually advisable to go the yearling route, adjusting the number grazed to the available pasture. It works best to run all steers or all heifers rather than mixing them.

There are many small farms near metropolitan areas. There might be changes in zoning regulations, so it is essential that land owners and stockgrowers be aware of such regulations. Stockgrowers should maintain good fences to control their livestock, and it is also essential that liability insurance be carried.

Business records

Keep a record of all expenses and income. This is necessary not only for income tax records, but is an aid to determining net worth and is essential for obtaining financing. Keep records on all expenses such as purchase of supplies, gas and oil, fertilizer, seed, utilities, and hired labor. Also, set up a depreciation schedule for depreciation on livestock, buildings, and equipment.

A tax accountant can be helpful on questions relating to IRS Schedule F (farm) Form 1040. Accurate business records, kept from year to year, also show financial progress being made, and if the enterprise is profitable.

Feeding and Nutrition

Cattle producers should have some understanding of the digestive system of cattle in order to feed them properly.

The digestive system

After the cud is re-chewed it is re-swallowed and passes down the esophagus into the reticulum. (See illustration.) Most of it then goes on to the omasum. When the omasum contracts, water is squeezed out while feed is being forced into the abomasum.

As feed continues through the digestive tract, there are more mechanical factors involved. Most of them are muscle contractions in the digestive organs that push feed along the tract.

The appetite of cattle depends somewhat on how much feed is left in the digestive tract. Easily digested feeds pass through the tract more quickly and leave the tract empty. The empty tract stimulates appetite.

In a normal ration, these are the times it takes feed to pass through each compartment in the digestive tract of cattle:

Rumen and reticulum	61 hours
Omasum	8 hours
Abomasum	3 hours
Small intestine	7 hours
Large intestine	8 hours

That's a total of almost 4 days for feed to pass through cattle. With some portion of the diet the time is even longer.

Stomach compartments

The ruminant stomach consists of four distinct compartments—the rumen, or “paunch,” as it is commonly called; the reticulum, or “honeycomb;” the omasum, or “manyplies,” so called because of the plies or folds; and the abomasum, or “true stomach.”

The rumen, at birth, is a very small organ found in the upper left area of the abdominal cavity. According to research findings, it develops in a series of fairly definite stages. When the animal is about 2 months old, the rumen descends from the upper left location to its normal position in a mature animal. The reticulum and omasum grow and develop rapidly during this first 2-month period. During the first 3 months, the rumen enlarges and develops physical characteristics found in the mature animal.

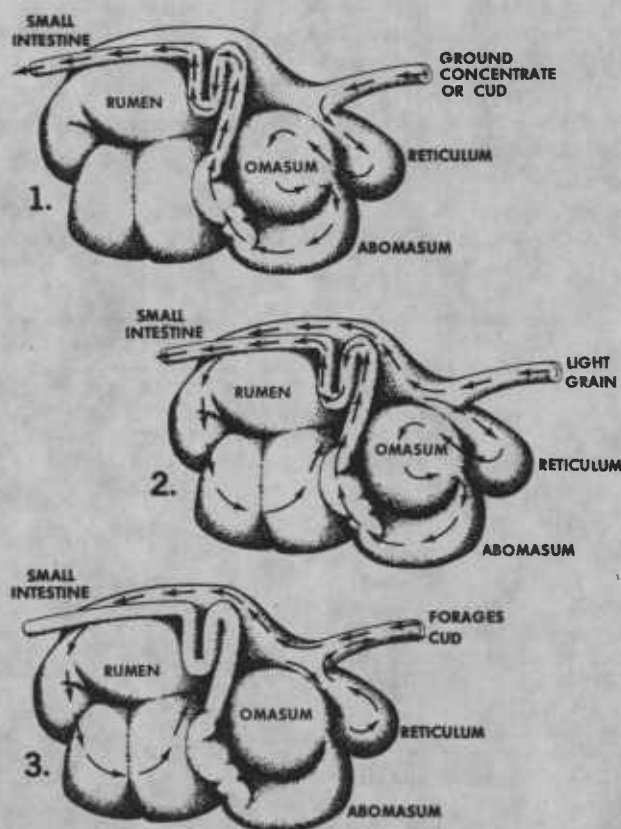
In young ruminant animals, the abomasum is the only functioning compartment of the stomach. Milk and other liquid materials pass from the esophagus to the abomasum through an esophageal groove and the undeveloped omasal area. This process continues until the other compartments of the stomach are developed and the young animal has started to consume more solid or dry feeds.

An idea of the tremendous size of the ruminant digestive system is given in this example showing capacities of the four compartments of the bovine stomach:

Rumen	20 to 48 gallons
Reticulum	1 to 3 gallons
Omasum	2 to 5 gallons
Abomasum	2 to 5 gallons
Total stomach capacity	25 to 61 gallons

These ranges allow for different animal breeds and ages.

THREE POSSIBLE ROUTES OF FEED IN RUMINANTS



Some basic differences between ruminant (cud-chewing) animals, such as cattle and sheep, and monogastric (having only one principal digestive cavity), such as swine and chickens, digestive systems are:

- Ruminants have a relatively large digestive system—large rumen plus other compartments, which enables them to use enormous amounts of roughage-type feeds in comparison with most monogastric animals.
- Ruminant animals have a much greater ability than non-ruminants to digest roughage before it enters the intestinal tract.
- The alimentary tract system in the ruminant animal is far more efficient than that of the monogastric animal in utilizing crude fiber.

These are the percentage digestion of the crude fiber in alfalfa hay by four different animals: cattle, 44; sheep, 45; horse, 39 (mainly in the cecum); swine, 22.

Ability of ruminants to use great amounts of roughage depends almost entirely on microbial reactions that take place in the rumen compartment of the stomach, and to a lesser extent in the intestines.

The rumen microorganisms are also important synthesizers of some of the essential nutrients. They can, for example, produce all of the so-called “essential amino acids” and all of the known B vitamins. The practical effects of these activities are that ruminant rations need not be balanced for these nutrients as they should be for simple-stomached animals.

Feed nutrients

In addition to water and air, all animals require nutrients. These include proteins, carbohydrates, fats, minerals, and vitamins.

Protein is usually well supplied by high-quality legume hay such as alfalfa or clover, young pasture grasses, or as high-quality grass hay. Protein supplements used with lower protein feeds include cotton seed meal, soybean meal, and linseed meal. Proteins contribute to development of muscle, hair, horns, and the body organs. High-quality alfalfa hay is a readily available source of protein, and in many areas is the most economical source. However, high-quality alfalfa hay and other legumes can cause bloat.

Carbohydrates and fats are sources of energy, and in addition to body maintenance, are used for gain in body weight. Feeds high in available carbohydrates are barley, wheat, corn, milo, oats, and grain by-products such as millrun and molasses.

Vitamins are necessary for health and growth. Green pasture, alfalfa hay, and well-cured grass hay are good sources of vitamin A. That is, green feeds contain carotene and this compound is converted into vitamin A in the digestive system of the animal. High-quality roughage, such as alfalfa hay or bright grass hay, is a rich source of vitamins as well as protein. Vitamin A might be deficient if cattle are on dry, bleached-out feed. Signs of vitamin A deficiency include watery eyes, rough hair coat, night blindness, and poor gains.

Vitamin D supply is seldom a problem where animals are given access to plenty of sunshine, since this vitamin is formed by the action of sunlight on plant and animal tissues. Lack of vitamin D may be a problem when animals are confined to a barn or stall where they never reach the sunshine.

Vitamin E, similarly, is seldom deficient, since it is supplied by high-quality green forage and by the germ portion of cereal grains.

As previously mentioned, ruminants synthesize all the B vitamins, and these need not be added to cattle rations.

Minerals are partially supplied through high-quality roughage and grain. Calcium and phosphorus are necessary for strong bones and teeth. Calcium usually is well supplied by alfalfa or other legume hay, and grains are a fair source of phosphorus. To make sure that animals have adequate minerals, provide a box or trough in the barn or lot with a mineral supplement recommended for the area.

Trace-mineralized salt is available and, when used, will provide the necessary trace elements that are needed in very small quantities. Trace minerals include copper, iron, iodine, cobalt, manganese, selenium, and zinc.

Plenty of clean, fresh water should be available at all times. An ideal temperature for water is from 45° to 50° F. Water is necessary for blood volume and acts as a solvent and cooling mechanism. Water is constantly lost from the body through evaporation from the skin, through breathing, and by waste elimination of urine and manures. In hot weather, a mature beef animal may drink more than 20 gallons of water per day.

As a general rule, a calf will eat up to 3 pounds of feed for each 100 pounds of its body weight per day. If it gets no other feed, a 500-pound weaned calf will usually eat nearly 15 pounds of high-quality alfalfa hay per day.

Roughages include hay, pasture, and silage—substances relatively low in digestible nutrients. Concentrates

are grains and protein supplements that are concentrated sources of digestible nutrients.

Barley is one of the most available concentrates. It can be substituted or interchanged with corn, milo, oats, or wheat. Because wheat is used primarily for human food, it is usually priced above other feed grains. When the price is low, however, wheat is a satisfactory feed for cattle.

Barley, corn, milo, oats, and wheat should be coarsely ground, cracked, or rolled in order to increase digestibility of these hard kernels.

Oats are good feed for growing calves, being fairly high in protein and, because of the hull, rather bulky. Although whole oats are sometimes fed to calves younger than 3 months of age, it is advisable to roll, coarsely grind, or crimp this grain in order to improve digestibility.

Molasses-dried beet pulp is slightly lower than barley in feed value. It is a succulent feed and helps prevent bloat when included with grain in the ration.

The most common protein supplements are cottonseed meal, linseed meal, and soybean meal. If high-quality alfalfa is included in the ration, the need for a protein supplement is decreased. Where non-legume roughage such as a poor-quality grass hay is fed, protein supplements should be added for growing cattle. A 600-pound calf will need about 1½ pounds of crude protein per day.

High roughage rations for growing

Small-farm operators often feed cattle as a means of marketing home-grown feeds, which may be primarily roughages. Many feeders prefer to grow lightweight cattle for a few months on a ration fairly high in roughage before changing them to a finishing ration when they reach about 700 pounds. Weaned calves should be wintered to gain 1.0 to 1.5 pounds per day, if grazed next season.

If they go directly to a feedlot, it is advisable to have cattle gain from 1.50 to 2.25 pounds per day on the growing ration in order to make economical gains and still eat a fairly large amount of roughage. The concentrate part of the ration can be about 1 percent of body weight during the warmup period, and can be increased for finishing.

Typical starting weights of steer calves, days until marketed, average daily gain (ADG), and final slaughter weights are shown in the accompanying table.

Starting weight, Days to Market, Average Daily Gain, and Final weight of Steer Calves

Starting weight of calf	Days to market	Growing		Finishing		Final weight
		Period	Gain/day	Period	Gain/day	
	Days	Days	Pounds	Days	Pounds	Pounds
400 pounds	270	130	2.0	140	3.0	1,080
500 pounds	250	110	2.0	140	3.0	1,140
600 pounds	210	70	2.0	140	3.0	1,160
700 pounds	150	150	3.0	1,150

• Calves will usually gain about .6 to 1.0 pound per day on high-quality hay.

• Feeding calves to gain 1. to 1.25 pounds per day—add 2 pounds of concentrate to the hay ration.

• Feeding calves from 400 to 700 pounds to gain 1.5 pounds per day—feed 25 percent concentrate and 75 percent hay.

• Feeding calves from 400 to 700 pounds to gain 2 pounds per day—feed 45 percent concentrate and 55 percent hay.

A recommended starting ration for calves weighing 400 to 500 pounds for the first 6 weeks to 2 months of the feeding period along with free choice high-quality hay is:

Crimped or rolled oats	50 pounds
Rolled or cracked barley or corn	40 pounds
Linseed, soybean, or cottonseed pellets	5 pounds
Molasses-dried beet pulp	5 pounds

If molasses-dried beet pulp is not available, increase the oats 5 pounds. This concentrate part of the ration could be fed at the rate of from ½ to 1½ percent of the body weight per day, depending upon the gains desired. So if a calf weighs 500 pounds, and is going to be kept on feed until slaughter time, it might be fed from 5 to 7 pounds of grain mixture along with free choice high-quality hay, until the concentrate part of the ration is increased when the calf weighs about 700 pounds.

A suggested ration for calves weighing more than 500 pounds is:

Rolled or cracked corn or barley	45 pounds
Rolled or crimped oats	35 pounds
Linseed, soybean, or cottonseed pellets	10 pounds
Molasses-dried beet pulp	10 pounds

Again, if molasses-dried beet pulp is not available, increase barley to 50 pounds and oats to 40 pounds. As animals increase in weight the amount of oats in the ration can be replaced with additional barley, corn, milo, or wheat.

High-grain rations for finishing beef

Most commercial cattle feeders who finish cattle to normal slaughter weights and the choice grade prefer to have the finishing ration contain minimum amounts of roughage. Rations vary according to the amount and kind of feedstuffs available, types of cattle to be fed, and rates of gain desired. Concentrate will be about 2 percent of body weight during the final 60 days of feeding.

Whether feed is purchased or grown and mixed at home will depend on the number of cattle to be fed. If one or a small number of animals are being fed it might be most economical to purchase a mixed ration from a feed dealer.

Finishing rations need not be complicated as shown in these examples.

Example 1.

Cracked or roller barley or corn	75 percent
Molasses-dried beet pulp	20 percent
Protein supplement	5 percent
	<hr/>
	100 percent

Example 2.

Rolled or coarsely ground wheat	50 percent
Rolled or cracked barley or corn	35 percent
Rolled or crimped oats	20 percent
Protein supplement	5 percent
	<hr/>
	100 percent

Feed according to size of calves, as shown in the accompanying table.

Amount of Feed, by Calf Weight

Calf weight	Concentrate	Roughage
	Pounds	Pounds
500 pounds	5 to 6	7 to 8
600 pounds	6 to 7	7 to 8
700 pounds	10 to 11	6 to 7
800 pounds	12 to 14	5 to 6
900 pounds	14 to 18	2 to 5
1,000 pounds	18 to 20	2 to 4
1,100 pounds	20 to 22	2 to 4

Winter hay requirements

During winter months a dry, pregnant cow needs from 20 to 25 pounds of hay per day. A lactating cow needs about 35 pounds of hay or its equivalent roughage. Usually the winter hay requirement runs from 1 to 2½ tons per cow, depending on the length and severity of the winter and availability of grazing through late fall and early winter.

Replacement heifer calves will need from 12 to 16 pounds of hay per day, increasing as they grow, and herd sires will require about 40 pounds daily.

Grain rations for the breeding herd during winter months are usually kept at a minimum, although herd sires may need some grain to be in proper shape for the breeding season. Heifer calves can be supplemented with 2 to 4 pounds of grain per day if the hay or roughage is not of high quality.

It is wise to segregate cattle by age for wintering. Heifer calves should be fed as a group, and also bred yearlings should be grouped by themselves. This gives these young cattle an opportunity to get their share of the feed. Mature cows push the smaller animals away from the feed when they are fed together.

Creep Feeding

Creep feeding usually is done by placing feed in a self-feeder. It should be located in a lot with a fence to keep older cattle out but have an opening for calves to pass through. Creep feeding usually is not necessary when mother cows are grazing good pastures. If the feed is dry, or in short supply, creep feeding will help calves. Several rations are suitable as a creep feed. The main idea is to keep the ration simple and as economical as possible. A simple mixture of one-half whole or crimped oats and one-half coarsely ground barley or cracked corn is excellent. To get the most gain for the least amount of feed, about 2 pounds of creep feed per day is all that should be supplied for each calf up to 3 months of age. As calves approach weaning time, they will eat from 4 to 6 pounds of creep feed per day. This will depend on quality of available pasture and the amount of milk received from the dam.

Creep feeding can add 30 to 60 pounds to a calf's weaning weight. Those extra pounds of gain may require 8 to 12 pounds of feed per pound of gain if the calf is self-fed. The decision to creep feed should depend largely on whether the added weight at weaning will more than pay for the added costs.

The accompanying table shows what creep feeding gains will cost at various feed price levels and feed conversion rates. For example, if it takes 8 pounds of feed

priced at \$5 per 100 pounds to produce an extra pound of gain, that extra pound costs 40 cents, not including added equipment or labor.

It is possible to improve creep-feed utilization by hand feeding about 2 pounds of feed per calf per day.

Cost Per Pound of Extra Gain Achieved by Creep Feeding

Feed needed per pound of extra gain	Cost per pound of gain when cost of feed per cwt. is:			
	\$4.00	\$5.00	\$6.00	\$7.00
8 pounds	\$.32	\$.40	\$.48	\$.56
10 pounds40	.50	.60	.70

Suggested Barley-Oats Creep Feed Rations

Ingredients	Ration		
	1	2	3
	Pounds	Pounds	Pounds
Coarsely ground barley	65	50	35
Whole oats	35	50	65
Total	100	100	100

Average Feed Consumption by Creep-fed Calves¹

Age of calf	Feed consumption	
	Per day	Per month
	Pounds	Pounds
1 to 2 months	½	15
2 to 3 months	1½	45
3 to 4 months	2½	75
4 to 5 months	3½	105
5 to 6 months	5	150
6 to 7 months	6½	195

¹ 500 to 600 pounds of creep feed from birth to 7 months.

Management of Cows and Calves

A major objective of every cattle producer is to have each cow produce and wean a live, vigorous calf each year. Breeding herd profit depends on percent calf crop, weaning weight of calves, cost of maintaining breeding animals throughout the year, and value of sale animals. Feeding and management of cows and heifers influences percent of calf crop and weight of calves at weaning time.

Heifers of British breeds weighing from 650 to 800 pounds when bred at 15 months of age should calve at 24 months. Heifers of some larger Continental breeds may reach maturity a little later, so they may need to be heavier and a little older when calving for the first time. The level of nutrition before and after calving greatly influences milk production and the length of time it takes the heifer or cow to rebreed after calving. Do not allow heifers to get too fat because it may cause difficult calving and poor milking. Maintain breeding animals in thrifty condition, without being too fat or too thin, so they will be productive over a long period of time.

Length of gestation period (from the time the female is bred until she drops her calf) is approximately 283 days. A small pasture near the house may permit a close

watch, especially important on a heifer calving for the first time. Heifers often experience some difficulty, so watch them closely as calving time approaches.

Symptoms of calving

There are several early symptoms of calving, including the udder swelling as it fills with milk, swelling of the vulva, and a clear mucus discharge. About 24 hours before calving the muscles and ligaments will relax between the tailhead and pin bones, accompanied by an unusually large discharge of mucus from the vulva. The cow usually shows little interest in feed at this time and normally isolates herself from the rest of the herd. Cows should calve in a clean area, such as on clean sod in an area protected from wind, or in a clean pen.

Assistance at calving

If a heifer has been in labor for 2 or 3 hours and is not making progress, or is having difficulty, she probably will need assistance. Experienced cattle producers usually can determine what to do. If you are not experienced, probably you should call a veterinarian or an experienced cattle producer.

In pulling a calf, use a sash chord or obstetrical chains and pull down, not straight out, applying more pressure on one leg than the other. This will move the calf's shoulders to reduce the shoulder area being forced through the pelvic region. Pull as the cow labors. Sometimes it is necessary to use a calf-pulling jack. These should be used only if necessary, and then with extreme care, because they can severely injure the cow's reproductive tract.

After calving

As the calf is born the breathing reflex is stimulated by passage through the pelvis and dropping on the ground. If breathing does not start right away or is difficult, hold the calf up by its hind legs and shake it to clean out the mucus from the nose and throat. Slapping the calf on the sides or gently dropping it often helps.

Dip the navel in iodine and make sure the calf nurses. The first milk (colostrum) contains antibodies that protect the calf from diseases present in the environment and also starts the digestive system.

Watch for passage of the afterbirth following calving. Work cautiously with the cow at calving time and while the calf is young.

A newborn calf is easy to catch and is not afraid, so this is a good time to put an identification tag in the calf's ear.

After calving, a cow needs considerably more feed than she did before calving. She is producing milk for the nursing calf, and if she is a young cow, she is still growing. It is usually not necessary to give cows supplement feeds if they are grazing improved pastures or native pastures where forage is plentiful. If cows have calved before grazing season begins, they need all the hay they will be able to eat on a free choice basis.

About 60 days after calving, the cow should be bred again. In order to reduce investment and still secure a good bull, owners of small herds might purchase a bull in partnership if they agree on some means of sharing his use. Leasing a bull from a neighbor is another means of obtaining a sire.

Artificial insemination can be a real asset to the small-herd owner; however, a successful A.I. program requires accurate heat detection (to avoid the expense of unsuccess-

ful attempts) and proper cattle-handling facilities. A small-herd owner may not be able to provide these inputs, and may not get good results.

Castrating

There are several methods of castrating bull calves. Most cattle producers prefer to use a knife. This involves minor surgery, but it is fairly easy to perform and is commonly done when the calf is 2 to 4 months old. If you are completely inexperienced, ask an experienced person to assist you.

Before starting the operation, disinfect your hands, a sharp knife, and the area around the animal's scrotum. Use a diluted solution of Lysol or other disinfectant.

The first method is to slit each side of the scrotum parallel to the middle line. Make the incision on one side, and remove the testicle from that side before making the incision on the other side. Make the incision over the center of the testicle, and from about the top one-third to the lower end. It is essential to extend the slit well toward the lower end of the scrotum so as to allow proper drainage.

In the second method, pull the scrotum away from the body and cut off approximately one-third of the bag. This will leave the testicles exposed so they can be removed by pulling away from the body. Sever the cords close to the body by simply scraping the cord with a sharp knife blade.

Calves can be castrated by taking the testicles out the back or front of the scrotum. If you use this method, use caution to prevent infection; drainage is not as effective as in other methods. Older calves are often castrated by using mechanical pinchers called Burdizzo.

After testicles have been removed, disinfect the area. In summer, use a fly-repellent material.

After the calf has been castrated and properly disinfected he can be returned to his mother, preferably in a clean area such as a grassy pasture, or a well-bedded stall where he can lie down without becoming contaminated.

Dehorning

Many cattle breeds are horned. It is now common practice to dehorn all steers to prevent their bruising other animals. This fairly simple operation can be done when the calf is less than 1 month old, or it can be done later, but preferably before weaning. Most commercial cattle producers will dehorn, castrate, and give some vaccinations in a single working. If you have someone helping castrate your calf, and if the calf needs to be dehorned, these two operations can be done before releasing the calf.

A caustic potash paste is useful for dehorning calves from 1 to 4 weeks old. For best results, caustic potash is applied around the base of the horn soon after the horn button appears. Do not allow the caustic material to get into the calf's eyes. Vaseline or salve can be applied to prevent irritation of skin adjoining the treated area. You should have experienced help when dehorning your first animal.

Tattooing

If you are raising registered cattle, you must include tattooing as part of your management practices. Tattooing instruments and ink are available at most livestock equipment companies or from your breed association. Instructions for use are included with the package. Clean your hands, equipment, and the ear to be tattooed. When the tattoo is applied, the numbers should be between the ribs

of the ears. After the tattoo has been pressed into the ear, use a small brush such as a toothbrush, and rub the ink into the small holes.

Weaning

Wean calves at 7 to 8 months of age. Earlier weaning may be profitable if the pasture is dry and in short supply. Many cattle producers wean calves from first-calf heifers when they are 5 to 6 months of age.

The easiest way to wean a calf is simply to separate the calf from its mother, provide plenty of clean, fresh water, and ample free choice hay and some grain.

Weaning is a time of stress for cows and calves. When the cows and calves are separated, the cows will continue bellowing for about 3 days. After that they will settle down and become accustomed to the separation. This stress can be reduced greatly if the calves are eating their feed and drinking the necessary water.

Creep feeding before weaning will help the calf wean off easier and start eating when separated from its mother. Calves that are born during the fall benefit from creep feeding, especially if the winter is severe and cold.

Caring for Newly Purchased Calves

When you purchase weaned calves, handle them with gentleness and care. Speak softly and move gently. This will help calves settle down and become accustomed to the new surroundings.

A small number of calves can be kept in a small lot where you can feed and observe them for several days. Keep plenty of clean fresh water available, along with suitable hay or pasture.

If dehorning and castrating need to be done, delay these operations for 3 to 4 weeks to make sure the calves are healthy and eating well. The seller should indicate what vaccinations or other health practices have already been given. If there are questions about additional shots that may be needed, it is a good idea to ask a veterinarian.

When working or moving calves, avoid using electric prods or other items that excite and scare them. Nervous animals are more difficult to work than those that are kept quiet and calm.

During periods of rain or cold weather, a day area in a barn or an open shed will provide adequate shelter. Such a shelter also can provide shade during hot summer months if shade from trees is not available.

Records of Performance

Records of performance are becoming increasingly important to anyone in the registered cattle business, and to commercial cattle producers.

Fertility of breeding stock is a major consideration. A beef cow should produce a calf each year, and the calf should be born early in the calving season. There is no substitute for regularity of reproduction.

Weaning weight of the calf is an indication of the mothering ability of a cow. A heavy calf at weaning time is usually the most profitable.

Growth rate after the calf is weaned is another performance characteristic that should be recorded. Generally, large calves eat more feed than small calves and consequently gain weight more rapidly. Feedlot operators prefer steers that will gain rapidly and reach market weight of 1,050 to 1,250 pounds at 15 to 18 months of

age or less. Yearling weight of breeding stock is an indication of how the offspring will perform.

Cow record sheets are available through your county Extension agent or through your breed association. Keeping records takes time, but it pays off by identifying the most productive animals.

Housing, Equipment, and Facilities

Beef cows do not need elaborate housing and under most conditions do best if kept outside. Forages in the diet produce large amounts of heat that can be used to maintain body temperature. The most important protection needed is from wind, cold rain, and mud. Access to a woodlot or a barn that is open on one side is adequate for most cow herds. In addition, a shed or barn for hay storage is usually required, except for those hay systems where hay can be stored outside.

An adequate year-round supply of clean, fresh water is basic to any successful cattle enterprise. The water supply should be free of ice in the wintertime. Automatic freeze-proof water fountains are usually a good investment. For various classes and ages of cattle to be fed separately, divide the wintering area into several lots, with water accessible in each lot or corral. It is possible to make an inexpensive trough by cutting a large, 55-gallon barrel of wood or metal in half to make two troughs that will hold about 25 gallons each. Thoroughly clean the containers before use.

Corrals and feedlots should be in well-drained areas convenient to feed-storage facilities. Drainage should be away from feed areas and driveways. The best location is a hillside with feed alleys and mangers extending along the high side. The least width or depth of the lot should run downgrade. Allow a bunk space of 22 to 28 inches per animal—if all animals eat at the same time. If feed is kept continuously before animals, 12 inches per animal is ample.

Workable and practical equipment makes cattle handling easier and safer, with less waste of time and labor. Many small farms do not have an adequate cattle handling facility. An effective working facility should at least consist of a corral, chute, and headgate. Without a handling facility, it is virtually impossible to perform certain jobs such as vaccination, pregnancy testing, and routine health practices.

An inexpensive feed trough can be made using 2-inch lumber cut in length to accommodate several calves. Allow about 3 square feet per head and make sides not less than 6 inches deep. If mounted off the ground, keep the height at about 18 inches.

Combination hay and grain feeders are popular, but cost more than feed troughs to build. The advantage of a combination-type feeder is that it saves feed, especially when leafy hay is fed. Shattered leaves are caught in the trough below the hay rack and are not wasted.

There are several good creep feeding systems in operation that make feed available to calves but prevent cows and other large cattle from getting to the creep feed. Under this arrangement, calves will learn to eat grain and hay as provided. A separate salt box for calves can also be placed in the creep.

Other necessary equipment may include a tractor with a front end loader, a manure spreader, and a hay wagon, depending on size of the beef operation.

Some trucks and trailers have an end-gate that lets down to the ground and is used for loading and unloading livestock. A portable loading chute is not difficult to build

and is a handy piece of equipment. Far too often portable chutes are made with too much step-up from the ground to the floor. Avoid this if possible.

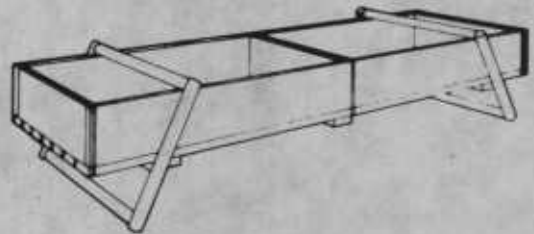
Homemade back-rubber

Back-rubbers will do much to control flies while cattle are on pasture or range. Commercial rubbers have reservoirs that automatically feed insecticide to the parts that cattle rub against.

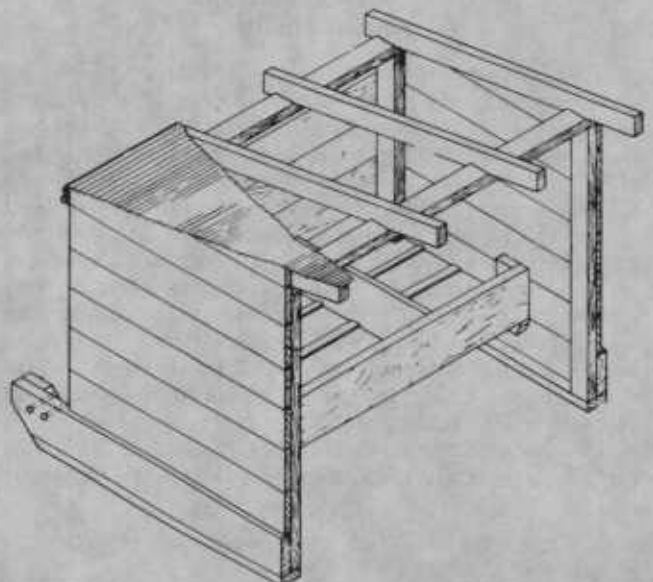
A homemade rubber can be made by placing two posts in the ground, 15 to 20 feet apart. Fasten a chain or cable made of two or three strands of barbed wire, about 4 feet high, at each post. Allow the chain or cable to sag at the center to within 18 inches of the ground. Wrap the chain or cable, and any brace wires for the posts, with three or four thicknesses of burlap; tie securely with binder twine. Saturate the sacks every few days with a recommended insecticide. (This is discussed under Insects and Parasites.)

Plans and numbers

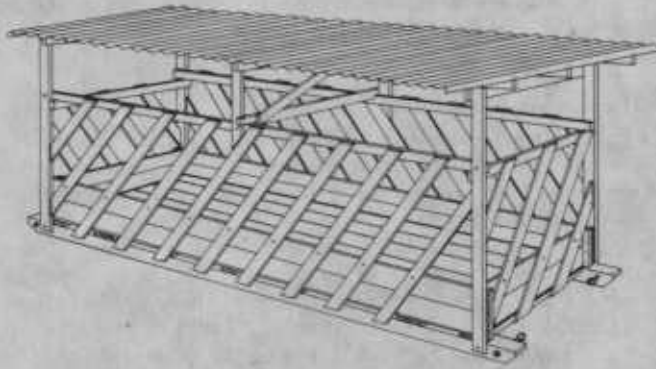
A complete catalog "USDA Design Idea Plans—Beef Facilities" is available from the Extension Agricultural Engineer, Department of Agricultural Engineering, Oregon State University, Corvallis, Oregon 97331.



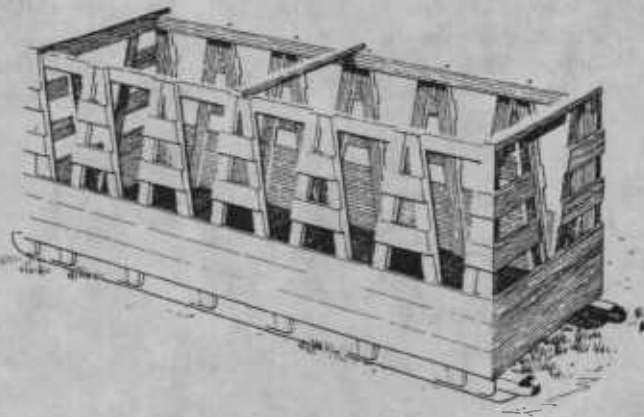
Cattle Feeders 6066 (1)
Variable x 12' Portable Bunk (Wood and Metal Constr.)



Salt and Mineral Box 5759 (1)
3' x 6' Portable (Wood Constr.)



Cattle Feeding Rack 5925 (1)
4' x 14' Portable (Wood Constr.)



Cattle Hay Rack 5772 (1)
4' x 13' Portable (Wood Constr.)

Animal Health

Like people, cattle are subject to disease. They require vaccination against serious disease problems, and protection from insect pests. If a veterinarian is needed, don't wait until the situation is critical. Be prompt and avoid complications resulting from delay.

Prevention provides the easiest and cheapest method of disease and parasite control. Clean sheds, lots, feed, and water troughs leave diseases or parasites little chance to get started. A sick calf is first noticed by such signs as scouring, constipation, loss of appetite, head down, and droopy ears. These signs warrant immediate investigation. Find out what is wrong with the animal, then work to eliminate the cause by either administering treatment yourself or, if necessary, obtain veterinary assistance. It is advisable to become acquainted with a veterinarian who can advise what vaccinations are in order in your particular area.

Common problems

Cattle of all ages, particularly young, growing cattle, are subject to a variety of ailments. These may range from mild bloat to severe infectious disease that may

cause death within 24 hours. Good management and a planned health program can prevent most disease.

- *Blackleg* is an infectious disease caused by bacteria that live in the soil. The soil on many ranches harbors this organism, and under certain conditions, cattle become infected. The onset is sudden, and most affected animals die. Lameness, with severe depression, is a sign of this disease.

Protect calves with vaccine at about 2 months of age; with a second dose given around weaning time to give additional insurance against contracting the disease. Other similar soil bacteria may cause problems in your area; check with your veterinarian regarding vaccines that may be needed. Several vaccines may be given at one time.

- *Brucellosis* (Bang's disease) causes abortion and some sterility in cattle, and undulant fever in people. Vaccination is advisable for all heifers. Age for vaccination is 2 through 9 months. Consult your veterinarian about a local program. State law effectively outlines brucellosis control.

- *Pneumonia* (Shipping fever) is a respiratory disease common in cattle. A number of factors influence an outbreak of pneumonia. Stress, plus viral and bacterial infection, usually contribute to the problem.

Stress factors reduce the calf's resistance to infectious agents. Weaning is a stress period for a calf. There is a change of diet, and often the calf will stand around and bawl for its mother. Transporting animals is another form of stress. The feeding regimen is disturbed and calves are exposed to virulent infectious agents to which they are not accustomed and disease results.

Vaccinating calves against two common viral agents, PI₃ and IBR, prior to stress periods is advisable. In addition, vaccinating with pasteurized bacterin will increase a calf's resistance to bacteria commonly encountered in pneumonia. Vaccines can be obtained from your local veterinarian.

- *White muscle disease* is a serious problem in many areas. It is caused by a deficiency of the trace mineral selenium in the diet of cattle. It may cause a paralysis of the skeletal muscles; calves are paralyzed, unable to rise. It may affect the heart muscle and cause signs of respiratory distress and death within a few hours.

The occurrence of this nutritional disease is spotty, depending on soil composition, fertilization, and farming practices where forages are produced.

In areas where it is likely to occur, losses can be prevented by injecting newborn calves with a commercial selenium/vitamin E preparation. Your veterinarian can advise you regarding the incidence of disease in your area.

- *Ringworm* is a fungus infection easily recognized by its rounded, light spots (often referred to as "dollar spots") of hair. The hair begins to disappear. Ringworm is highly contagious; infected areas itch, causing animals to rub. Infection is spread from animal to animal, or from infected quarters and equipment. Early care prevents spread and destroys infection in one to three treatments.

Should ringworm appear on your cattle, begin treatment immediately. Treatment should include a thorough bath with a detergent; this will wash out many spores and help stop spread. Following the bath, a rinse with 1 percent captan will kill most established fungi. Three treatments are necessary, one every 5 days. Other effective fungicides include iodine, or an iodine/glycerine mixture, applied to infected skin areas.

- *Bloat* in cattle is a digestive disturbance, with accumulation of gasses in the rumen. It causes discomfort; in acute cases, death may occur in a matter of minutes.

Feeding conditions causing bloat are quite variable. Keep coarse hay before animals on legume pasture. Legume pastures often are involved when bloating occurs, but other feeding conditions have been known to bring on the disturbance. Heavy grain rations can cause trouble in the feedlot. Walking the animal may remove slight bloat. Antifoaming agents, given by mouth, usually relieve bloat. If bloating occurs consistently, try daily feeding of small amounts of poloxalene to prevent bloat. Turpentine, or kerosene, 2 to 3 ounces in a pint of milk or mineral oil as a drench, may cause belching. Sticking the animal in the middle of the area, between the hip and last rib on the left side, with a trocar and canula, or knife, should be attempted only as a last resort. Call your veterinarian immediately.

- *Scours*, or diarrhea in young calves is common and can be caused by a number of conditions. Consuming excess amounts of milk will cause some calves to scour. Generally, this will not be too serious and often will correct itself spontaneously.

Many infectious agents exist that affect the intestine of calves causing a high percentage of calves to scour and many deaths. Both bacteria and viruses are involved in these serious, difficult to control infections. To reduce the level of exposure to infection, raise calves in a clean environment with a minimum of mud or manure. Exposure to cold and rain causes stress and contributes to scouring of baby calves.

- *Footrot* in cattle is an infection causing lameness due to swelling, inflammation, and decaying tissue. Rough footing is likely to cause foot injuries in cattle. Injured feet, plus mud and filth, make ideal conditions for the spread of footrot.

Many treatments are effective after trimming hoofs and removing all dead tissue. Soaking feet in a bath of saturated solution of copper sulfate is effective. Repeat after 4 to 5 days, if necessary. Several antibiotics, including penicillin, are useful for treatment. Discuss effective control measures with your veterinarian.

- *Warts* are skin growths caused by virus infection. They are contagious to man and animals. Daily application of castor oil or other oily base materials may cause warts to disappear. Wart vaccines often are effective on beef animals. Consult your veterinarian.

Insects and parasites

- *Flies* not only bite and suck blood, they are also a tremendous annoyance to cattle. As a result, cattle spend considerable time in shade or in places of protection, and don't graze or eat normally, which causes poor performance.

There are several types of flies. The stable fly and horn fly are most common, but there are others such as the horsefly, heel fly, and of increasing concern, the face fly.

Adult flies multiply in wet, dirty places such as manure piles. Elimination of such breeding areas is the first step in control, while spraying cattle and buildings regularly with recommended chemical insecticides will enhance control.

Face flies are difficult to control and many require application of spray or dust every 3 to 5 days. Individual animals can be treated by dusting with 3 percent ciodrin or 1 percent Co-Ral. Ear tags are also available to control flies.

Self-applicating devices, such as dust bags or back-rubbers, are useful when treating large numbers of animals. Read and follow recommendations and precautions when using pesticide chemicals to control insects.

- *Lice* cause great financial loss to cattle producers. They do the most damage during the colder months. Suspect the presence of lice when cattle rub excessively against fences, trees, etc., and when bare spots show up, especially on the rump, rear quarters, neck, and shoulders. There will be a dark "blackish" discoloration of the hair, around the eyes, and muzzle due to large concentrations of lice. To eliminate lice, spray cattle thoroughly before winter, using a power sprayer and a suitable commercial insecticide. See your county Extension agent for recommendation. Two sprayings, 10 days apart, may be necessary. If lice appear in the winter, spraying can be done when favorable weather permits.

- *Warbles* (cattle grubs) are the maggot stage of adult heel flies. Though the heel fly does not bite or sting in the process of laying eggs in the hair on the lower legs of cattle, it terrifies the animal, causing it to run with tail hoisted, seeking relief. It may run through fences, over cliffs, or become bogged down in a swamp. A favorite type of relief is for cattle to wade into deep water and stand or seek deep shade for long periods of time.

The fly eggs hatch and the larvae penetrates the skin and migrate to the back of the animal where they remain about 5 weeks before leaving the host and dropping to the ground, ultimately to become adult flies and repeat the cycle. This is possibly the most destructive insect of all, for cattle perform poorly when chased by the adult fly. Larvae are particularly damaging to carcass and hide. Breaking a grub under the skin can cause an abscess and extreme shock.

Presence of grubs can be detected by feeling for characteristic bumps over the back. Each bump will have a hole in the skin through which the grub obtains air and eventually emerges.

Grubs can be controlled by treating cattle in the fall, following the heel fly season.

Compounds such as Co-Ral, Neguvon, Ruelene, Tiguvon, or Warbex can be obtained from your veterinarian or farm store and are effective in controlling grubs. Compounds are available in spray or pour-on preparations. Use according to directions on the container. Applied during October, chemicals kill grub larvae as they migrate from heel to back, preventing the grub from reaching the back region and damaging back muscle and hide. Breaking the life cycle at this point prevents heel fly activity during warm summer months.

- *Internal parasites* such as roundworms, lungworms, flukes, and coccidia commonly occur in cattle under 2 years of age. These hidden parasites cause poor performance and occasionally kill young animals. Have your veterinarian give consideration to these problems and make appropriate recommendations when on a routine visit to your place.

Roundworms and liver flukes are likely to be picked up when cattle graze established irrigated pastures. Subsequent invasion of the stomach or intestinal wall causes improper function of the affected organ. Signs of damage include scouring, rough hair coat, and potbellied appearance. Administration of the proper worm remedy (anthelmintic) can greatly improve livestock performance when parasitism exists.

Worming also can be accomplished by injection or through feeding. Solicit the advice and recommendation of your veterinarian. New products and improved methods are being developed.

Basic instruments and tools

A vaccinating syringe is one of the most useful instruments for disease prevention. Syringes vary in construction and size. One of the handiest syringes for vaccination is a 25 cc metal syringe with glass barrel and rubber plunger.

A 16- or 18-gauge needle, 1 inch long, is recommended for cattle. Before using the syringe, sterilize the entire instrument in boiling water. Mineral oil may be used on the rubber plunger. After use, take the syringe apart. Wash in clean, soapy water, rinse, dry, loosely reassemble, and wrap in clean paper or cloth for storage.

Chlorhexidine antiseptic is excellent for sterilizing instruments. Hold hypodermic needles in boiling water before use. Place instruments such as castrating knives and dehorning saws in a disinfectant solution for a sufficient time interval to avoid their carrying blood-borne diseases, such as anaplasmosis, from one animal to another.

A balling gun is useful for administering medicine orally in capsules or pill form. The medicine must be placed far back in the mouth to prevent the animal from spitting it out. The size of the animal will determine the size of the balling gun used.

A dosing syringe is handy for giving liquid medicine by mouth, but you may use a slender-necked bottle, such as a pop bottle, instead. To give liquids, elevate the head slightly so the medicine will flow back in the mouth and be swallowed.

Marketing

The current systems for marketing cattle in the U.S. are efficient. Weekly livestock auctions are held in strategic locations. They make it possible for several buyers to bid on each sale lot, whether it be a single animal or several similar animals making up a sale lot. In some geographical areas several small-scale beef producers are combining livestock for special cooperative sales. Another outlet for high-quality feeder calves is the market for 4-H and FFA project animals.

The goal of most feeders is to have carcasses grade USDA Choice without being too fat. As an animal fattens, the percent of fat in the carcass becomes greater. Waste fat must be trimmed before the cuts of meat can be presented in the retail counter.

Conformation is the shape or manner of formation of the carcass. Thickness in relation to length or depth is a major index of conformation, but conformation is not a factor in quality grade.

Yield grade

Yield grade, or cutability, is a term designating the yield of trimmed retail cuts in a carcass. Factors used in determining yield grade are fat thickness over the rib eye, rib eye area, percent internal fat, and warm-carcass weight. There are five yield grades—1 through 5. Carcasses in Yield Grade 1 are leanest and have the highest percent cutability, while carcasses in Yield Grade 5 are the fattest and have the lowest percent cutability. We seldom see a Yield Grade 5 carcass because the industry has eliminated most of these due to excess fat.

The illustration shows Yield Grades 1 through 4. Note the area of lean meat in the rib eye area and also the thickness of fat around the outside. By examining these illustrations you can determine main differences in yield grades.

The meat industry prefers carcasses weighing between 600 to 750 pounds; however, carcasses weighing from 550 to 800 pounds are acceptable in most areas if they will grade USDA Choice without being too fat.

In late 1980 there was more than \$30 difference in carcass value from one yield grade to the next on carcasses that weighed approximately 650 pounds. Because of differences in true carcass value, it is essential that breeding stock be identified to produce the right kind of carcass.

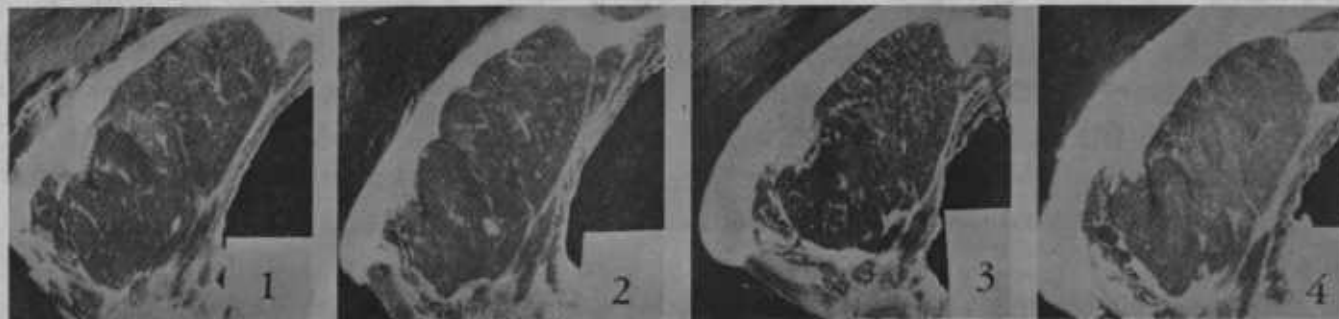
Carcass merit

Although all beef carcasses are inspected and certified as wholesome, quality grading by USDA meat graders is optional. The grader designates carcass merit. Carcass merit includes such things as quality grade and yield grade—yield of trimmed retail cuts. Grades make up the value of the carcass.

If graded by the USDA the quality grade insignia is stamped on the carcass so that the grade can be seen on the outside of each wholesale cut.

USDA quality grades

There are eight USDA quality grades for steer and heifer carcasses: Prime, Choice, Good, Standard, Commercial, Utility, Cutter, and Canner. Cow carcasses are eligible for all grades except Prime. Each grade represents a different quality of meat and is a reliable guide to tenderness, juiciness, and flavor.



Most young cattle, from 1 to 1½ years of age, that have been fed in a feedlot or at home for several months, will grade in the top four grades at time of slaughter.

Approximately 6 percent of the fed beef in the United States grades Prime, 70 percent grades Choice, 20 percent grades Good, and about 4 percent Standard and below.

USDA Prime is the highest quality grade. Only steer and heifer carcasses are eligible for it. This is a youthful carcass and must have at least "slightly abundant" marbling in the rib eye muscle.

Choice is the grade preferred by most of the industry because it is preferred by most consumers. It is well-finished but has less fat than Prime. For a carcass to grade

USDA Choice it must have at least a "small" amount of marbling.

USDA Good carcasses have less marbling in the rib eye than Choice—only a "slight" amount.

USDA Standard grade is a young carcass in which the rib eye has only "traces" of marbling.

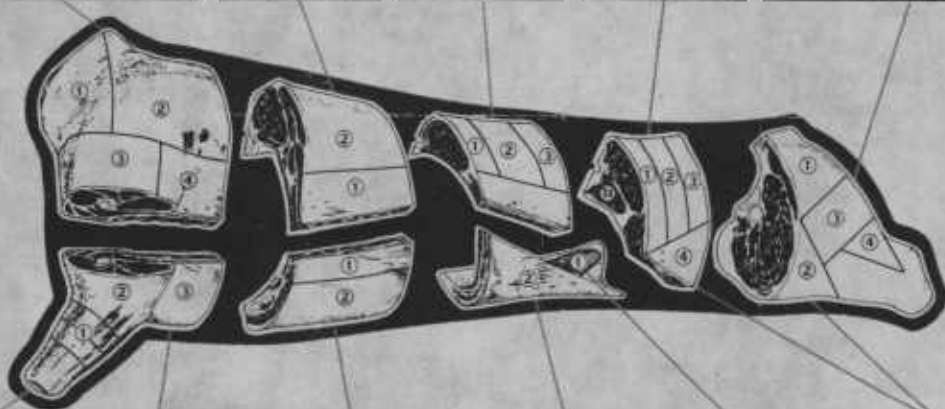
Beef Facts

It takes 2 years, or longer, from the time a cow is bred until the resulting calf is a finished beef, ready for eating. Assume a steer has a live weight of 1,150 pounds. After the head, hide, feet, and internal organs are re-

BEEF CHART

RETAIL CUTS OF BEEF — WHERE THEY COME FROM AND HOW TO COOK THEM

<p>CHUCK Roast, Cook in Liquid</p>	<p>RIB Roast, Broil, Panbroil, Party</p>	<p>SHORT LOIN Roast, Broil, Panbroil, Party</p>	<p>SIRLOIN Roast, Broil, Panbroil, Party</p>	<p>ROUND Roast, Cook in Liquid</p>
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<p>FORE SHANK Roast, Cook in Liquid</p>	<p>BRISKET Roast, Cook in Liquid</p>	<p>SHORT PLATE Roast, Cook in Liquid</p>	<p>FLANK Roast, Cook in Liquid</p>	<p>TIP Roast</p>
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*May be Broiled, Broiled, Panbroiled or Panbroiled from high quality beef.
**May be Roasted, Baked, Broiled, Panbroiled or Panfried.

This chart approved by
National Live Stock and Meat Board

moved at the packing plant, the resulting carcass would be about 60 percent of the live weight, or 690 pounds. In the packing plant, the 690-pound carcass is divided into two sides by splitting it down the middle of the backbone. Each side is then divided into the forequarter and the hindquarter by making the separation between the 12th and 13th ribs.

Some retail stores still buy beef by a side or a quarter at a time, but the trend is toward having the carcass cut into wholesale or even retail cuts at the packing plant. This reduces transportation of excess fat and bone. Retail stores are able to order exactly what they want. Having this so-called prefabrication done at the packing plant is a great saving for the meat industry and for the consumer. Constant improvements are being made in the beef industry.

The two halves of a 690-pound carcass will weigh approximately 345 pounds each. Usually between 75 and 80 percent can be sold as salable meat. This is because bone, excess fat, and trimmings are taken off the carcass and are not included in the salable retail cuts that go into the meat counter. So we see that a 690-pound carcass would yield from 500 to 550 pounds of salable, trimmed retail cuts.

Retail cuts, and location in the carcass are shown in the chart on page 13.

Cow Talk—A Glossary of Terms

If you are going to work with cattle, learn commonly used cattle terms.

Abomasum—the fourth compartment of the ruminant stomach.
Backfat—fat thickness measured at the 12th rib.
Balance—the harmonious relationship of all body parts, blended for symmetry and pleasing appearance. A steer poorly developed in the hindquarter would lack balance.
Bang's disease—contagious abortion; brucellosis.
Bang cows—cows that show reaction to test for brucellosis.
Barren—sterile female.
Blocky—compact, wide, deep, low-set animals.
Bloom—condition of skin and hair.
Bos indicus—generic name for domestic humped cattle common to the tropical countries; Zebu or Brahman.
Bos taurus—generic name for domestic cattle common to the temperate zones; Hereford, Shorthorn, Angus, etc.
Bottom side of pedigree—inheritance from the dam's side of pedigree.
Bovine—term referring to all cattle.
Bred—a pregnant female; for example, a "bred cow" is one that is definitely in calf, or pregnant. The term is used also to refer to the mating process. For example, "She was bred, or mated, on April 10."
Breed—animals of like color, type, and other characteristics, similar to those of parents of past generations.
Breed character—features or characteristics that distinguish one breed from another. An animal is said to possess breed character when it possesses a wealth of characteristics peculiar to one breed.
Breeder—the owner of a dam of a calf at the time she was mated.
Breeding—act of mating a heifer or cow with a bull, or of artificial insemination.
Breedy—cows with a high degree of femininity; bulls with strong masculine features.
Brisket—the breast or lower chest.

Broody—a good mother cow.

Bull—uncastrated male cattle of any age.

Buller—cow in continuous heat due to cystic ovaries or other physical defects.

Bulling—a cow in heat; apparent when a cow tries to ride other cows or stands while others try to ride her.

Bully—animal, heifer, or steer, with masculine visual characteristics or actions.

By—designates the sire.

Calf—young animal of either sex, under 1 year.

Calving—time when a cow gives birth to a calf.

Carcass—the animal after slaughter, with head, hide, internal organs, and legs below the knee or hocks removed.

Castrate—to remove the testes (tes-tees') of male cattle.

Cat-hammed—thin hindquarters.

Characteristic—a part, or desirable trait, in an animal.

Chromosome—carrier of genes or inheritance characteristics. That is, genes are part of the chromosomes.

Chuck—major wholesale cut in the forequarter of a beef carcass.

Clean—negative test for brucellosis; free of disease; animal believed to be free of gene for dwarfism.

Close breeding—linebreeding or inbreeding; mating of related animals.

Cod—the scrotum; fills with fat as animal finishes.

Commercial breeding—breeding of grade animals, generally to produce market beef.

Conceive—to become pregnant.

Concentrates—feeds low in fiber and high in food value, for example, grain and most protein supplements.

Conception—union of ova and sperm; the beginning of a new individual.

Condition—degree of fatness in animals.

Conformation—general structure and shape of an animal.

Constitution—refers to the hardiness and vigor of an animal and is perhaps best evidenced in the chest capacity, its width of floor, and fullness of ribs.

Cool out—reduction of grain ration, usually after show season; using corn and barley with oats and bran to lighten feed.

Corn silage—chopped, entire green corn plant, stored in an airtight silo.

Cow hocked—hind legs bowed in at the hocks as viewed from the rear.

Cows—female cattle having had one or more calves.

Creep feeding—providing a calf with feed as a supplement to its mother's milk and pasture.

Crop—depression behind the shoulder of a cow.

Crossbred—an animal resulting from crossing two or more breeds.

Cryptorchid—male cattle with one or both testes undescended.

Cull—to eliminate an animal of low quality from a herd.

Cutability—carcass cutout value, or yield of salable meat. Sometimes designated as yield grade by USDA meat graders.

Dam—mother of a calf.

Dehorning—act of removing horns from cattle.

Dewlap—a hanging fold of skin under the neck or brisket.

Digestion—process of breaking down feeds into nutrients in the stomach and intestinal tract; used by the animal's body for growth and fattening.

Docile—ability of an animal to be quiet and gentle, especially around strange conditions.

Dog or Doggy—an animal lacking finish, quality, and size.

- Double muscling**—a misnomer for an undesirable genetically controlled display of gross muscular hyperplasia—an enlargement of all muscles in the animal's body, most noticeably demonstrated by bulging muscles in the round and shoulder. Tailhead is set forward; body is shallow.
- Dropped**—born; birth given to.
- Dwarf**—an abnormally small, short-legged, early maturing calf of about 700 pounds mature weight. Dwarfs usually do not reproduce.
- Embryo**—developing young during early pregnancy.
- Estrus**—period when cow will accept bull for breeding; heat period. Estrus occurs about every 21 days and lasts about 18 hours. It does not occur when the animal is pregnant.
- Estrus cycle**—length of time from one heat period to the next—21 days in cattle.
- Family**—tracing ancestry; line of breeding.
- Fat thickness**—depth of fat measured over the rib eye muscle at the twelfth rib.
- Fed cattle**—steers or heifers fattened on grain for slaughter.
- Feed conversion**—the ratio of pounds of feed eaten to pounds of gain produced.
- Feed efficiency**—term for the number of pounds of feed required for an animal to gain 1 pound of weight; e.g., 6.5 pounds of feed per pound of gain.
- Feedlot**—group of pens, or barn lot, where steers and heifers are fattened for slaughter.
- Fertility test**—test of semen for live sperm count; to test ability to produce offspring.
- Fetus**—developing young calf (or any vertebrate) during late pregnancy, after it attains the basic structure of its kind.
- Fiber**—that part of a feed not easily digested by the animal; hay stems, and corn cobs.
- Finish**—the degree of fatness. This term is often used interchangeably with "condition" but as finish, the fat should smoothly lay over the body in a proper degree to suit the market.
- Fitted**—animal fed, trained, and groomed for show or sale.
- Free choice**—allowing animals to eat as much as they want at any time.
- Freeze branding**—an identification method done by clipping hair from the brand area, wetting skin with alcohol, then applying a branding iron cooled in liquid nitrogen or dry ice and alcohol.
- Forage**—generally pasture and/or hay.
- Founder**—a nutritional ailment from overeating; foundered animals become lame with sore front feet and excessive hoof growth.
- Freemartin**—the female member of unlike twins showing many male characteristics, incapable of reproducing because of exchange of blood between the two embryos, and the presence in the female circulation system of male hormones.
- Gate cut**—method of dividing a group of cattle by driving through a gate and separating them impartially.
- Gene**—one of the biologic units of heredity contained in the chromosome, each of which controls the inheritance of one or more characteristics.
- Genotype**—actual genetic makeup of an individual.
- Gestation**—period between mating and birth of the young—approximately 284 days for cattle.
- Get**—calves sired by same bull.
- Grade**—a beef animal with one or both parents not registered or recorded; also a measure of carcass merit; e.g., yield grade, USDA grade.
- Grooming**—care of animal such as washing, clipping, brushing, etc.
- Heavy (with calf)**—late stages of pregnancy in cows.
- Heifer**—female which has not borne an offspring.
- Herd bull battery**—all of the bulls in service in particular herds.
- Herd sire**—principal breeding bull in a herd.
- Heredity**—characteristics an animal receives from both parents. Heredity is determined when sperm and egg unite.
- Heritability**—part of an animal's variation caused by heredity and not by environment.
- Hindquarter**—back half of a carcass (beef), usually divided between the twelfth and thirteenth ribs; loin and round.
- Hooks**—hip bones.
- Hooky**—prominent hooks.
- Inbreeding**—when sire and dam are close relatives; see Close breeding.
- In heat**—the time when a cow will accept service of bull.
- Lactation**—the period the cow gives milk; from calving to weaning—about 7 months.
- Linebreeding**—selective breeding; sire and dam of same similarity of heredity, but not as closely related as inbreeding.
- Loin eye**—area of loin eye or rib eye at 12th rib; used in carcass evaluation to determine meatiness of carcass.
- Long barrelled**—lack of body depth.
- Long rump**—good length from hooks to pin bones.
- Management**—selecting, feeding, and caring for beef animals.
- Marbling**—interspersed fat in the muscle or lean part of a beef carcass as viewed in a cross section of the loin.
- Market beef**—steer or heifer fed for producing meat.
- Market value**—price received for a live animal.
- Meat packer, processor**—slaughters live animals and sells sides or quarters of beef, or wholesale and retail cuts to retailers, restaurants, and other quantity purchasers.
- Motility**—activity of bull's semen as seen through microscope.
- Natural thickness**—muscling in an animal. In a live animal, muscling can best be observed in the round and over the forearm, as well as between hooks. The outside of the thigh (round) is where fat is deposited last, and the muscle can be seen more readily.
- Nick**—when a bull produces outstanding calves from females of a certain line of breeding.
- Nursing**—a calf getting milk from its mother; also, a cow producing milk for her calf.
- Nutrient**—chemical ingredient in a ration, such as protein and vitamins, that help develop bones, muscles, and finish.
- Omasum**—compartment of the four-part stomach of cattle or sheep.
- Open**—the non-pregnant or empty female.
- Out of**—designates dam.
- Ova**—female sex cells produced on the ovary and carrying a sample half of the genes carried by the female.
- Ovulation**—release of ova into the oviducts; 12 to 15 hours after end of estrus in cattle.
- Outcrossing**—mating of unrelated animals within the same breed having no common ancestors in the first generation.
- Overfitted**—overweight, too fat.
- Parturition**—act of birth.
- Pasture bred**—cow serviced by bull in pasture.
- Paunchy**—potbellied; oversized stomach.
- Pedigree**—a table presenting a line of ancestors for an animal; a genealogical tree.
- Performance test**—measure of performance; specifically, rate and efficiency of growth, and carcass traits.
- Pin bones**—anterior portion of pelvis; protrude on each side of rectum.
- Placenta**—afterbirth; the sack or membrane covering the calf when it is born.
- Plain**—animal lacking quality and breed character, considered off-type.

- Polled**—cattle born without horns.
- Post-legged**—an animal having extremely straight hind legs.
- Pregnant**—heifer or cow that has conceived and not yet calved.
- Prepotent**—above average in ability to transmit individual's desirable traits to offspring.
- Production records**—measure of a cow's productivity; based on number and weaning weights of calves she has produced in her lifetime.
- Progeny test**—measure of an animal's offspring, usually bulls; generally to determine transmission of heretability traits such as rate of gain, conformation, meatiness, dwarfism, etc.
- Protein supplements**—a protein concentrate containing 32 to 44 percent protein; for example, cottonseed meal, linseed meal, soybean meal.
- Purebred**—not to be confused with Thoroughbred, which is a breed of horses. A purebred is a member of a particular breed; i.e., a purebred Hereford, etc. Not necessarily registered cattle, but out of registered bulls and purebred cows.
- Purebred breeding**—breeding of purebred animals to maintain the breed or provide foundation stock for commercial herds.
- Purse**—a small bag or pouch remaining on a steer where testicles were before castrating.
- Quality**—overall excellence or superiority of an animal; general smoothness and neatness in appearance. Quality is the opposite of "coarseness."
- Quality grade**—grade given a beef carcass; closely related to marbling, age of the animal, and color of the lean. The most common quality grades are Prime, Choice, Good, and Standard.
- Rangy**—extremely long-legged cattle.
- Ration**—amount of feed given to an animal during a 24-hour period.
- Reactor**—an animal that reacts to a test for a specific disease such as Bang's disease or tuberculosis.
- Registered**—recorded in the herd book of a recognized breed association which issues a certificate that the animal is the offspring of registered parents and meets registration requirements.
- Retail cuts**—cuts of beef bought by the consumer, in a grocery store or meat market.
- Retailer**—market that sells beef to consumers.
- Reticulum**—a compartment of the four-part stomach of cattle or sheep.
- Rib eye**—main muscle exposed when carcass is separated into front and hindquarters. Area of rib eye, sometimes called loin eye, at 12th rib—used as indication of muscling.
- Ridgling**—an animal with one testis removed; half castrated.
- Roughages**—feeds such as hay, silage, pasture.
- Round**—major wholesale cut in the hindquarter of a beef carcass.
- Rumen**—largest compartment of the four-part stomach of cattle or sheep.
- Ruminant**—an animal that chews its cud, and has a stomach composed of four parts. Cattle and sheep are ruminants.
- Safe-in-calf**—pregnant beyond doubt; usually reported after vet's examination.
- Scale**—refers to development in size and frame and has to do with dimensions of height, length, width, etc., rather than weight, which may include fat or condition, rather than growth and development.
- Scours**—diarrhea. Young calves may get scours by consuming too much milk, by being housed in a cold, damp building, or by infection from other animals.
- Screw worms**—insect pests that attack open wounds on cattle; usually found in warm climates.
- Serotum**—the bag enclosing the testes (testicles).
- Scrub**—an animal of mixed or unknown parentage, usually without definite type of breeding; considered to be plain, cull, or off-type.
- Seurs**—small, imperfectly formed horns not attached to the skull.
- Seedstock**—foundation animals for establishing a herd.
- Served**—a bred female, not guaranteed safe-in-calf.
- Service**—act or ability of breeding.
- Sheath**—the tubular fold of skin into which the penis is retracted.
- Sickle hocked**—hind legs curve under the body in a "sickle" fashion, as viewed from the side.
- Sire**—father of a calf.
- Soggy**—beefy, deep, thick.
- Spay**—surgical removal of ovaries.
- Springer**—heifer or cow showing signs of advanced pregnancy; near to calving.
- Stag**—male bovine castrated after sex characteristics are developed.
- Steer**—male bovine castrated before sexual maturity.
- Stretch**—body length, between shoulder and hooks.
- Structural soundness**—physical condition of the skeletal structure, especially feet and legs.
- Style**—a desirable trait in any animal for it includes appearance, attractiveness, alertness, grace, and carriage. A stylish animal attracts attention.
- Substance**—bone and frame with associated muscling. Substance (bone) is generally associated with ruggedness throughout the body.
- Switch**—tip of tail where the hair is longest.
- Tail-end**—poorest quality portion of group of animals; to tail-out is to remove animals from the bottom of a group.
- Tattoo**—an indelible mark or figure used on registered animals for permanent identification. To indicate the year the animal was born, a combination of letters and numbers in the ear or ears are used.
- Top-end**—highest-quality portion of group of animals; to top-out is to select from the best.
- Trait**—distinguishing quality or feature.
- Trimness**—freedom from excess fat and flabbiness about the brisket, underline, and flanks.
- Twist**—region between hind legs where thigh muscles join.
- Type**—a collective term used to describe the sum total of all those characteristics that make up the ideal beef animal and that suit any animal for a specific purpose—beef type, dairy type, etc.
- Top side of pedigree**—inheritance from sire's side of pedigree.
- Up-standing**—long-legged, rangy, tall.
- USDA Grade**—graded by U.S. Department of Agriculture.
- Weaned**—no longer nursing its dam. Weaning is the act of separating the calf from its mother, generally at 7 to 8 months of age.
- Weanling**—a calf recently weaned.
- Weight per day of age**—measure of weight gain; usually from birth to weaning, or from birth to 1 year old.
- Well-bred**—animal of high-performing breeding lines of ancestry.
- Yearling**—an animal about 1 year old.
- Yield grade**—numerical score given to a beef carcass that is based on estimated percentage of carcass weight in boneless, closely trimmed retail cuts from the round, loin, rib, and chuck.