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4-H Beef Project

A Pacific Northwest Extension Publication

Oregon • Washington • Idaho



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4-H Beef Project

Beef production is an important part of American agriculture and is one of the largest industries in the world. As a 4-H member you have an opportunity to be a part of this industry—gaining valuable career experience and training in beef cattle production, and having fun while you learn.

Once you have decided to have a beef cattle project, you then need to decide what type of project you prefer. Should you have a steer feeding project, a breeding project, a management project, or should you participate without an animal? The answer depends on your particular interest, your resources, and the space you have for raising cattle. You may wish to take one option when you start the beef project and add more as you gain experience.

Project Opportunities

Market Project

Because the market project involves feeding one or more steer calves to market weight, you must conduct it on a year-to-year basis. Typically, you will show these animals at your county fair or some other show and then sell them. The market project is well suited to club members who have a limited area to raise cattle. Although the market project does not require much land, you do need a shed and lot or corral to keep animals comfortable and under control.

The market project is a good beginning beef cattle project but you must have enough money to buy an animal and the necessary feed. If you buy a weaned feeder calf about 7 to 10 months old, you can feed it out and sell it as a market animal in less than a year. This means you get your investment back within a relatively short time. The market project usually will return the original price of the calf, plus the cost of feed and sometimes a small return for your time and labor. The responsibility of feeding and caring for a project animal gives you the opportunity to learn a great deal about the beef cattle business.

Breeding Project

The breeding project is an excellent start toward building your own herd of breeding cattle. Many 4-H members have developed a herd of cattle and have earned enough from their herd to pay for part of their college education. Developing a herd of breeding cattle requires much more land than the market project. Be sure you have enough land (either owned or leased) to maintain a breeding herd.

One of the goals of owning a beef breeding herd is to breed the females. Usually you can arrange this with a neighboring registered breeder or other beef breeders in your area. Also, you might find a local artificial insemination organization or representative who can help you breed your heifers. For further information on breeding heifers in the herd, see the "Cattle Producer's Library" Series located in your local Extension office. The publications that will help you are CL 200, CL 210, CL 400, CL 402 and CL 415.

It usually is to your advantage to select a breed of cattle located close to your home so you will be able to use bulls from someone's herd in your immediate area. Most established breeders are glad to help young cattle producers get started. If you buy heifers from a registered breeder, he may be able to rebreed them for you.

When developing a breeding herd, decide whether to have registered purebred cattle or commercial cattle. The feeding and management of the breeding herd are generally the same whether they are registered or commercial. Development of a registered herd means both the sire and the dam are within the same breed association. To develop such a herd you need to register the desirable purebred calves.

A commercial program usually involves breeding grade females to a purebred bull. You may develop a herd within one breed or you may develop a cross-bred herd.

A breeding project is a long-range program; you will not begin making money for at least two years. Since the project takes considerable time and money, you should take great care in selecting your foundation breeding females.

Additional Opportunities in the Beef Project

Ownership of a 4-H beef project offers you three options. You may (1) lease and manage one or more animals from a breeder; (2) develop and manage a small feedlot or production-oriented (cow and calf) project; or (3) do a project without animals.

If you don't have the facilities and/or finances for a market, feeder or breeding project, you might select the first option, leasing one or more animals. If you choose this option, you will need to decide with your parents and the breeder where the animals will be housed, what your work responsibilities will be, who will pay for feed, what work you will do with the animals, and who will be responsible for the loss of an animal. You, your parents, and the breeder should draw up an agreement covering these important details.

The second option, developing and managing a small feedlot, requires a large amount of money to start the project, and a long time for cash return. This is an excellent project for older youth, as it establishes a base of economic return and offers experience in the total management of a project. You should, however, have experience in the feeder or breeding project before undertaking this project.

Some alternatives for a feeder project include: a feedlot for feeding out cattle; raising replacement heifers; raising feeder cattle; and small cow-calf operations.

The third option is to participate in 4-H without an animal. If finances and space are a problem, this is an excellent option. You can learn a lot about cattle and participate in many of the same activities involved with the other two options. With the advice and assistance of your leader, you can share responsibilities with other members in working with their animals. If your local 4-H program conducts a 4-H Livestock or "Beef" Bowl, you may want to participate in that activity as well.

A History of Cattle

People have used cattle for centuries. Cave dwellers hunted them thousands of years ago. Cattle used to be wild, but as people became more civilized, they learned to tame and raise their own cattle.

Christopher Columbus brought the first cattle to the New World. He delivered them to settlers in the West

Indies, who used them as work animals. They were Spanish longhorn cattle. Cattle were brought to this country by explorers and early settlers. Today there are more than a billion head of cattle in the world.



Figure 1. Christopher Columbus brought the first cattle to the New World.

Two types of cattle were introduced. The Pilgrims and other New England settlers brought cattle from England known as British cattle. Explorers and missionaries from Spain brought longhorn cattle from Mexico into the southwestern part of this country. As European settlers came to America, many of them brought their own cattle with them. These cattle are known as the European breeds.

British cattle were big and strong, so they were used mostly as work animals. Spanish longhorn cattle, ancestors of the famous Texas Longhorn, were small compared with British cattle. But they were hardy creatures that could stand the hot climate of the Southwest.

Cattle numbers in the United States increased as the human population increased. By 1800, cattle raising had spread westward from New England into Ohio. Sixty years later it had moved as far west as Missouri and across the southeastern part of the country. By 1850, Texas was the leading cattle producing state in the nation, and Chicago was the leading packing center.

Breed Type

A breed of livestock can be defined as a group of animals sharing a common ancestry within a species. Beef breeds have common inherited characteristics that distinguish them from other breeds. Each breed association has developed a standard which breeders try to meet when breeding or selecting animals.

Beef breeds are known for differences in size, muscling, milking ability, carcass traits, calf size, and weather tolerance. Beef animals also differ in hair color, markings, and whether they are polled or horned. These differences often determine if a beef animal can be classified by breed type.

The beef industry has undergone vast changes in the past several years. Never before has there been such a wide variety of breeds from which to choose. Before selecting a breed or combination of breeds, you should consider the following points:

- All breeds have strong and weak points.
- No one breed is good for all situations.
- There are sometimes vast differences within breeds.

When selecting a breed of cattle, you should use the following guidelines to help you make an objective decision.

- Survey the area in which you live to see which breeds are best adapted to local conditions.
- Study the local and regional market demand for the calves you will produce.
- Compare the good points of a breed or breed cross already produced in your area with those of apparently useful breeds that are not being raised in the same area.

Once you have selected a breed, you should follow breeding practices that lead to genetic improvement of the herd.

Breed Characteristics

Cattle have been selected and developed for many years with a particular purpose in mind. Breeds were selected for beef, milk production and draft or work purposes. The following list illustrates the many different breeds of beef. It is not meant to be a complete listing of all breeds of beef cattle.

The breeds are categorized according to their origin.

British Breeds

Angus
Devon
Galloway
Hereford
Murray-Grey
Polled Hereford
Red Angus
Red Poll
Scotch Highland
Shorthorn
South Devon

Brahman Crosses

American Brahman
Barzona
Beefmaster
Brangus
Charbray
Santa Getrudis

Brahman and European Breeds

Blonde d' Aquitaine
Brown Swiss
Charolais
Chianina
Gelbvich
Limousin
Maine-Anjou
Marchigiana
Normande
Pinzgauer
Romagnola
Salers
Simmental
Tarentaise

Other

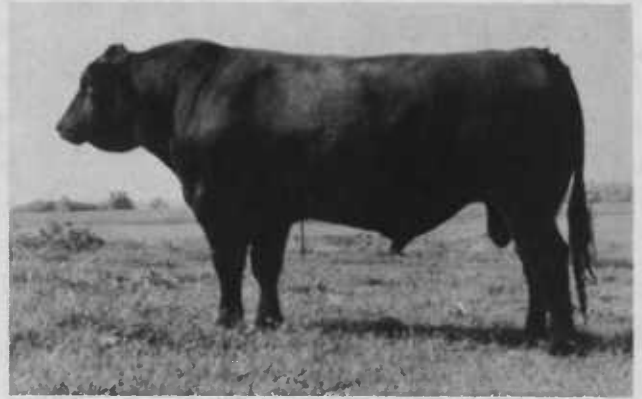
Beefalo
Hays Converter
Longhorn

Breeds of Cattle

Over 60 different breeds of cattle are available to beef producers in the United States. This section describes those breeds of cattle that make or have made a significant contribution to the beef cattle industry in the Pacific Northwest.

Amerifax

In 1971 seven breeders in South Dakota, Nebraska, Wyoming and Kansas began crossing an imported Beef Friesian bull with purebred and commercial Angus cows, with the intent to breed for more profitable beef production. In 1977, they formed the Amerifax Cattle Association. The association claims that maternal traits, good disposition and growth are the three traits most needed in today's beef cattle herds, and Amerifax excel in all three. The Amerifax is black or red, polled or scurred and of medium size.



Angus

The Angus breed originated in Scotland more than 200 years ago from black polled cattle native to Aberdeen and Angus-shires. The first herd book was established in 1862. In the late 1800s Angus cattle were crossed with native Texas Longhorn cattle. Since then, the breed has become one of the most popular in the United States.

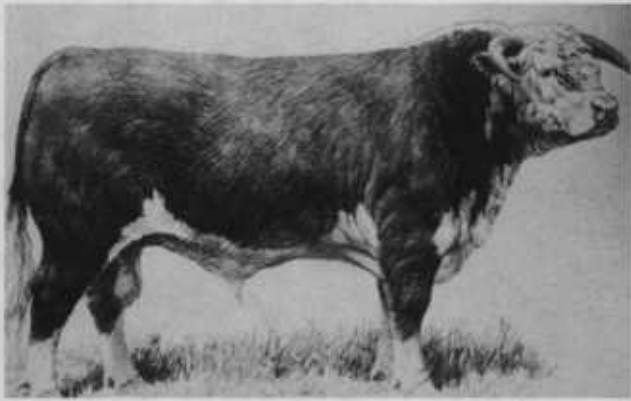
The breed is naturally polled with black skin and black hair. When Angus cattle are cross-bred with horned breeds of European origin, the cross-bred calves are always polled. Calves produced from Angus crosses with Charolais usually are dark or smoky white. In crosses with red-bodied breeds, all strains are black but may have white markings characteristic of the other breed. Angus cattle transmit maternal characteristics to their offspring including fertility, efficiency under minimal management conditions, early age of puberty, calving ease, mothering ability, and longevity. Angus cattle also are known for their ability to transmit marbling to their offspring.



Barzona

F.N. Bard enlisted the help of geneticist E.S. Jack Humphrey to combine the genetics of five breeds—Hereford, Shorthorn, Brahman, Angus and the Africander. The Barzona Breed Association was formed in 1968 to service the breeders involved. The Barzona is generally medium red, but may vary from dark to light red, and is medium-sized with a longish head. Barzona are both polled and horned.

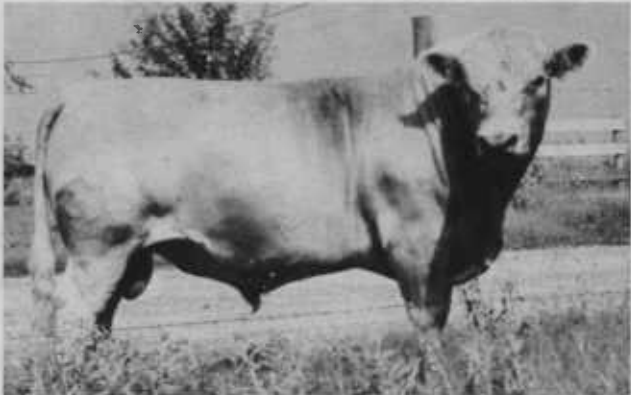




Hereford

Hereford cattle originated in 1817 in the county of Hereford in England. They are characterized by horns and a white face crest dewlap, underlap and switch. Their legs are white below the hocks and knees and their bodies are red. Kentucky statesman T. Henry Clay imported the first Hereford cattle. The second importation of this breed, in 1840, provided for the establishment of Herefords in the United States. In the late 1870s large numbers of Hereford cattle were imported and the breed became popular.

Herefords have superior foraging ability, vigor and hardiness. Under rigorous conditions they tend to produce more calves than any other breeds. These characteristics, along with their docile nature, account for Herefords' popularity in the western United States. Hereford cattle are very popular as a straight breed, but also are successfully crossed with many other breeds of cattle.



Murray-Grey

Murray-Grey cattle originated in Australia from a cross of Angus and Shorthorn. They range in color from silver grey or grey to dark grey or dun. Some dun pigment may be found on the underbody, and the breed has a dark muzzle. They are naturally polled. Murray-Grey cattle were first imported into the United States in 1972. The Murray-Grey breed is noted for small birth weight, low calf mortality, and excellent carcass quality.



Polled Hereford

The history of the present-day Polled Hereford cattle can be traced to the original parent horned Hereford breed imported from England. The first serious Polled Hereford breeding program began in 1898, after Warren Gammon, a young Iowa Hereford breeder, saw polled cattle on exhibition at the World's Fair. Gammon asked members of the American Hereford Association for information on animals that had any polled characteristics, and subsequently located and bought four bulls and ten females. A dominant mutation resulted in the polled trait Mr. Gammon had sought, and in 1900 he organized the American Polled Hereford Club.

Red Angus

Red Angus are similar genetically to the black Angus. The red pigment is inherited as a simple recessive trait of the Angus breed. Red cattle have occurred in the breed since its earliest development. Except for their color these cattle are similar to the black Angus breeds. Red absorbs less of the sun's heat, which may be an advantage in hotter climates.



Shorthorn

The Shorthorn breed originated in the late 1700s in northeastern England. Shorthorns were first imported into the United States between 1820 and 1850. They are characterized by their variable color pattern which ranges from red to roan to white. As the name implies, the horns are relatively small. There is a polled gene in the breed and polled Shorthorns have become so popular that they rival horned cattle in number. Shorthorns are noted for their maternal ability. The Shorthorn cow is an excellent milker and weans a heavy calf. There is no breed of cattle more docile than the Shorthorn. Its disposition is unexcelled and cattlemen appreciate the ease with which it can be handled. In cross-breeding programs, the Shorthorn contributes several maternal traits: milk production, ease of calving, disposition, early maturity, and moderate cow size.

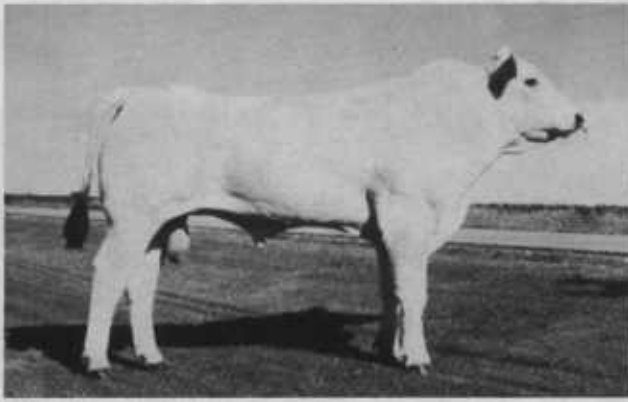


Charolais

The Charolais is one of the oldest of several French breeds. It was developed in the district around Charolles in Central France. The King ranch of Texas is credited with importing the first Charolais bulls into the United States from Mexico in 1936. In France, the typical Charolais is slightly thicker, heavier muscled, shorter legged, and heavier boned than the American version. This body type may cause a greater incidence of calving difficulty than found in the domestic Charolais.

The Charolais' coat is white or a very light straw color. Most Charolais cattle are naturally horned, but a growing number of polled animals are being registered. Charolais cattle are large sized, long bodied, and heavily muscled. The Charolais breed's outstanding characteristics are its growth rate and carcass cutability.





Chianina

The Chianina breed originated in the Chianina Valley in Italy. Italian Chianina cattle are the oldest and tallest of all cattle breeds. Mature bulls can stand 72 inches at the withers and weigh up to 4,000 pounds while females can weigh up to 2,400 pounds and stand 60 to 68 inches at the withers. They have porcelain-white hair, a black tongue and palate, a black nose and eye-hair, and a black switch. Because Chianina are later maturing, they produce leaner, higher cutability carcasses at a given age or weight than other exotic breeds. The Chianina cattle tend to have a nervous disposition which is objectionable to some cattle producers.

Carcass data suggest half-blood Chianina steers need to weigh over 1,300 pounds to safely grade choice. Chianina bulls cross especially well with smaller, thicker Angus cows. Steers bred this way have ranked very high in interbreed, on-hoof and carcass competitions.



Gelbvich

The Gelbvich was developed in West Germany. It comes from four triple-purpose yellow breeds. The Gelbvich is a reddish-yellow dual-purpose breed and is a bit smaller and slightly more refined in bone structure than the Simmental. The breed is strong in growth and maternal traits. Heifers reach puberty at a lighter weight than many of the continental breeds. The Gelbvich has a gentle disposition and can tolerate cold weather slightly better than hot weather.

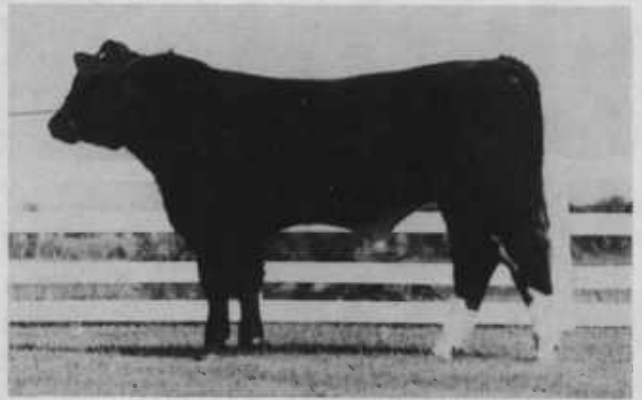


Limousin

The Limousin is a reddish-gold colored, strictly beef-type breed from Central France. They are light horned cattle with no record of polled mutations. Limousin cattle are known for their carcass cutability. Limousin sired calves weigh less at birth and are easier to deliver than calves sired by other European breeds. Generally, the Limousin is considered a terminal sire breed that works especially well in situations requiring rapid muscle improvement and low calving difficulty.

Maine-Anjou

The Maine-Anjou is a red and white, dual-purpose breed found in northwestern France. It is the largest French breed in body weight and length. The cattle are dark red and white, or sometimes roan. They have slightly pigmented skin and medium-sized horns that curve forward. Maine-Anjou cattle excel in growth rate, milk production, and carcass cutability.



Pinzgauer

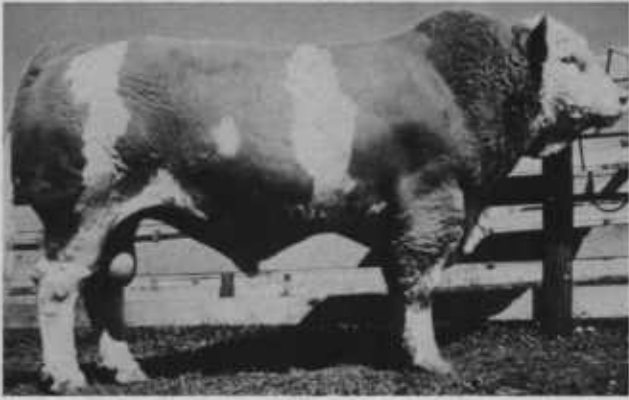
The Pinzgauer breed originated in the Pinz Valley of Austria. The cattle are deep red and have a white tail and barrel. Pinzgauer cattle are known for their excellent mothering ability, high fertility, ease of calving, rapid growth of calves, and good milk production. The breed is naturally horned, with a well-shaped, short and small horn that turns downward and forward.



Salers

The Salers breed was developed in the rugged mountains of Central France. Saler cattle have a solid, deep cherry red coat, sometimes spotted with white markings under the belly. Their hair is thick and sometimes curly. Salers are horned. When Saler bulls are bred with Hereford cows, the offspring have red bodies and white faces. The breed is considered to have the easiest calving of all European breeds. This is due to the small head, slender neck, and long body. Other redeeming characteristics of the breed are milk production, calving ease, and carcass quality and cutability.





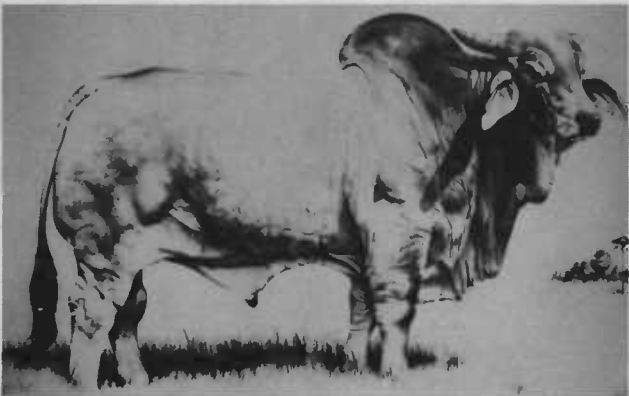
Simmental

The Simmental breed originated in the Simmen Valley in Western Switzerland. Simmentals vary from yellowish-brown or straw-colored to a dark red. Combined with white markings, the head underside of brisket and belly generally are white. The legs and tail usually are white and there may be white patches on the body. The hair is soft and the skin is lightly pigmented. The horns are fine and white, and they curve outward from the side toward the front with the tips turned slightly upward. Simmental cattle are known for their fertility, milk production, growth rate, and carcass cutability.



Tarentaise

The Tarentaise originated in the Savoy Alps in Southeastern France near Switzerland and Italy. The cattle have a solid light cherry to dark blond hair coat. Bulls normally darken around the neck and shoulders as they mature. The breed is adaptable to different climatic conditions, and is considered a dairy breed in its native region. Tarentaise cows are known for their strong maternal and feminine qualities. Because its region of origin is mountainous and not particularly fertile, the Tarentaise also has achieved a reputation for vigor and hardiness.

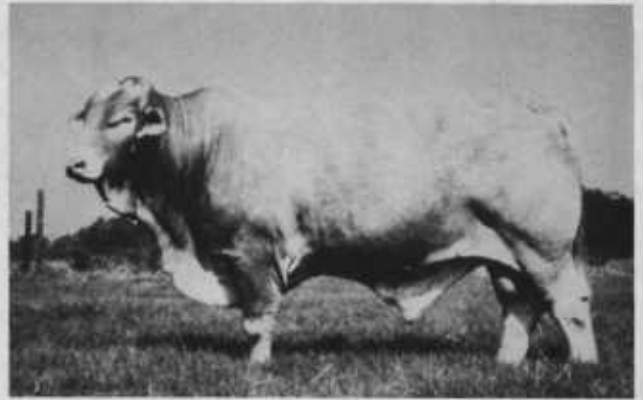


American Brahman

The Brahman breed was developed in the southern United States in the early 1900s. American cattle producers developed the Brahman by combining several Indian breeds and upgrading British females. Brahman cattle have a characteristic hump over the shoulders, loose skin, dewlap under the throat, and large drooping ears. Their color may range from light gray or red to almost black, with the prevailing color usually light to medium gray. Brahman cattle are resistant to ticks and are more tolerant of heat than are British or European cattle breeds. Brahman cattle exhibit a great deal of hybrid vigor and the offspring often exceed both parental types in growth rate and reproduction.

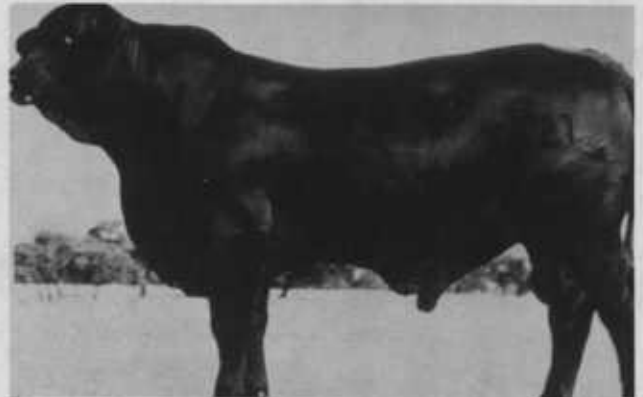
Beefmaster

Development of the Beefmaster began in 1931. Three breeds—Hereford, Shorthorn and Brahma—were combined to produce the Beefmaster as we now know it. The breed is made up of approximately 25 percent Hereford, 25 percent Shorthorn, and 50 percent Brahma hereditary material. The criteria stressed in the initial selection program were disposition, fertility, weight, confirmation, hardiness, and milk production. The breed's color pattern varies, but reds and duns are predominant. Most Beefmaster cattle are horned, but polled animals do occur.



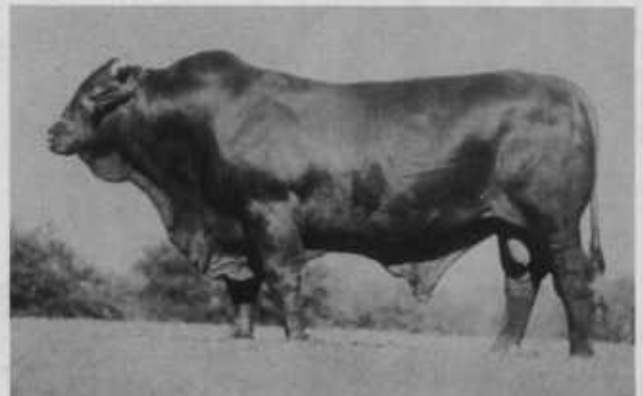
Brangus

Brangus cattle were developed in the United States by blending the Brahma and Angus breeds. They are five-eighths Angus and three-eighths Brahma. Brangus cattle are larger than Angus and may have some Brahma characteristics such as surplus skin in the dewlap and cheeks. Brangus cattle are black and polled—both inherited, dominant qualities.



Santa-Gertrudis

Santa-Gertrudis was developed at the King Ranch in Texas by crossing Brahma and Shorthorn breeds. The breed is cherry red and, while the majority are horned, polled animals do occur and are acceptable. They have loose hides with increased surface area due to neck folds and sheath or navel flap. Mature cows frequently attain a weight of 1,500 to 1,600 pounds and mature bulls, 2,000 pounds.



NOTE: A complete listing of these National Breed Associations and others not mentioned, along with their mailing addresses, appears on page 50 of this manual. Also included is a listing of the three Northwest Cattle Producers Associations.

Business and Marketing Aspects of a 4-H Beef Project

Business and marketing are an important part of your 4-H beef project. It is important to recognize that many skills you acquire in this project are directly related to the economics of livestock production and marketing. For example, many traits you evaluate in selecting livestock are primarily related to what the market will ultimately pay for the product (beef) you are producing. The primary purpose of selecting quality livestock is to identify and select characteristics that will be in demand with buyers.

How Do I Get Started?

The primary purpose of your beef project is to offer you a fun-filled learning experience. In addition to learning about purchasing and raising a market animal or beginning to build a breeding herd, a fundamental part of your beef project is to become aware of the business part of raising beef animals. With your beef project, as with any business venture, one of the most difficult questions you'll face is, "How do I get started?"

Financing

Finding sources to fund a 4-H beef cattle project can be challenging. The money needed to buy the animal(s), feed, supplies, and equipment is substantial. In fact, the beef cattle project is one of the more costly projects within the 4-H Program. If you don't have the funds to get started, don't give up. You can get started by borrowing money. In fact, this process can be an excellent incentive to learn more about records and financial management. Four possible sources of financing a 4-H beef project are:

1. Your savings or earnings.
2. Parents or other family members. In some cases, the county 4-H leaders council may have a program to help finance projects. Interest (payment on money borrowed) may not be due until the project is complete.
3. Local banks, savings and loans, or interested individuals often will help finance a beginning 4-H beef project.
4. Some feed stores or feed cooperatives extend credit for the duration of the project, providing feed and supplies. Payment is not required until the

animal is sold. Check with these businesses prior to budgeting for your beef project.

If you decide to borrow the funds to begin your beef project, you will need to draft a written request to the lender listing your proposed expenses and income (a budget) and schedule of repayment. Sometimes it is possible to pay for an animal by working for the person who sold you the animal. If you do this, be sure to do a respectable job because you will be learning the cattle business and gaining experience at the same time.

When starting your project, consider insurance on your animals. Livestock insurance is available from a number of insurance companies and may be a good investment for the new 4-H member in the Beef Project. Check with your local county Extension agent on insurance information.

Regardless of where you obtain financing for your beef project, good records are a necessity. They provide a measure of progress for your 4-H project.

Below is a sample of a budget that may be used to estimate costs and income associated with your beef project. It is important to remember that when preparing a budget, there is no correct answer. A budget is merely a reflection of the anticipated costs and expected return from the project.

Budget

When considering the cost of feeding a steer, include the purchase price of the steer to get the approximate cost of the steer project. For example:

Cost of steer, 500 lbs @ \$1.00/pound	\$500.00
---------------------------------------	----------

A steer purchased November 1 and fed out for a show in August would need to be on a growing ration for approximately 150 days or until about the end of March, then put on a finishing ration for the final 120 to 145 days.

Rolled barley, 5,000 lbs (2.5 tons @ \$52.00/ton)	\$130.00
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Protein supplement soybean or cottonseed meal, 675 lbs @ 14¢/lb	\$ 94.50
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Hay legume or grass legume 15 percent protein, 1 1/2 tons @ \$80.00/ton	\$120.00
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Feed cost	<u>\$344.50</u>
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Cost of steer and feed	\$844.50
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The steer in this example would weigh about 1,250 pounds by the August show. It would have to sell for 77¢ per pound in order for the project to break even. Additional costs could include equipment, transportation, entry fees, and vet supplies.

Financial Records

Financial records are an essential part of your project. Records provide an important map of where you started and a trail of where you have been with your project. A beginning 4-H member usually lacks experience in the financial requirements of raising a market animal or beginning a breeding herd. Your completed 4-H record book provides an excellent history of financial progress. Expenses may be recorded monthly, but keep track of all money spent on your beef project (feed, medicine, equipment, etc.).

Marketing

A 4-H market beef project is often sold through an auction at county fair. Sometimes the price received is slightly inflated from the going market price due to the excellent support from community business people. Following is a short discussion of how a feedlot manager might market finished cattle.

A buyer offers to purchase cattle based on either a live or carcass price. If the buyer offers to purchase a pen of cattle with a live bid, weighing conditions are very important. If a truck scale is on the premises, cattle may be loaded on the truck and weighed. Often, these cattle are given a “pencil shrink”—deducting a percentage of their weight to account for the food, water, and waste still in their systems. A pencil shrink of 3 percent takes the place of holding them off feed and water for 12 hours, and offsets the loss of “belly fill” (excretory shrink) during the time they are hauled to market.

A second type of shrink is “tissue shrink,” which typically doesn’t take place until cattle have been transported for 16 hours or more without feed and water. When cattle are purchased on a live basis, the buyer pays the freight charges.

Selecting Project Animals

You and your family should consider the following suggestions before selecting a project calf or beef project animal:

1. Whichever breed you choose, buy healthy cattle. Find out what vaccinations or other health treat-

ment have been given to the animal and when these were done. Also find out whether additional vaccinations or treatments are necessary in the near future.

2. Whether the calf you plan to select is a steer or a heifer, try to purchase an animal that is an outstanding example of modern beef type. Remember that type starts with size for age, and proper skeletal structure. Carefully determine whether the calf’s weight for age is adequate and if the thickness of the calf is due to muscling or excessive fat. In order to make wise selections, a knowledge of beef type is essential, as is a knowledge of breeds and their characteristics. Ability to properly judge and evaluate beef cattle is a talent that must be developed. Learn the points that contribute to basic soundness and usefulness of the animal and keep these foremost in mind. You can develop these skills by participating in judging contests and clinics.

When selecting breeding heifers, visit several breeders before purchasing a female for your herd. Ask the breeder for performance records on the animals offered for sale. From these records you should be able to tell the weight for age—the growth rate, and how this compares for the average of the herd and breed. Growth rate is moderately inheritable so you should place particular emphasis on this characteristic when selecting a heifer. Give special consideration to structural correctness on breeding animals.

When selecting a heifer for your breeding herd, look at the sire and dam and their performance records. By looking at the parents you can get a general idea of how the heifer will look as she grows and develops into a producing cow in the herd. Many projects have been started with a heifer guaranteed to be bred. These heifers usually cost more money than a younger animal that has not been bred. You need to consider age and weight in selecting weaner calves as project animals. A heifer should be 65 percent of her mature weight at 14 months of age if she is to breed and calve by 24 months. A heifer 8 to 10 months old when purchased in the fall will need to gain 1 to 1.5 lbs per day to meet these goals.

The Modern Beef Type Animal

Most of today’s consumers prefer tender, tasty USDA Choice beef with a minimum of fat. The meat-type steer produces a carcass yielding the maximum amount of trimmed retail cuts from a carcass grading USDA Choice. The most desirable steer is a fast growing, heavily muscled animal that will reach a market weight of 1,050 to 1,250 pounds at 14 to 20 months of age, and is well developed in areas of the most preferred cuts—loin, rib, rump, and round.

Steers of larger breeds may weigh more than 1,300 pounds by the time they grade choice.

Table 1 (below) outlines expected finish weights as related to frame size. Bigger calves will finish at heavier weights. When selecting project animals, choose those that will finish within the weight requirements for your county fairs.

Table 1. Typical Growth Weights for Steer Calves

Weight of calf	Days to show	Growing		Finishing		Final weight
		Days	Gain/ day	Days	Gain/ day	
		Pounds	Pounds	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

A side view of a meat-type steer shows moderate depth of body and a fairly long back, loin, rump, and round. A small-framed, early maturing steer will produce a low cutability carcass at comparable slaughter weights. Today's steer is trim through the middle and the brisket, throat, and flank. Excessive fat from the side view can be seen in a heavy brisket, deep full flank, and a heavy bulge just above the hock on the lower quarter. An over-fat animal shows considerable smoothness over the outside of the shoulders and may have a full twist, a large full cod, and excessive fat around the tail head.

The meat-type steer shows muscling when viewed from any angle. A steer of desirable type is heavily muscled, straight-lined and well balanced. Remember that the modern type steer is moderately long bodied and tall, but need not be extremely so. A tall, shallow-bodied, light muscled or narrow steer is no more correct than a very low set, compact, small sized calf.

At every opportunity, evaluate live steers and compare your assessment with the actual carcasses. This is one of the best opportunities for associating live animal characteristics with their true carcass value.

When you pick your calf, have in mind a picture of the modern, meat-type slaughter steer. It is a mistake to pick calves that are light muscled and small. Avoid calves that are extremely low set and deep bodied. They may finish out with a fairly large middle, and if carried to an ideal market weight, may become excessively fat. Also avoid animals that are long-legged, shallow-bodied, and narrow because

they lack necessary muscling for an ideal steer. The illustration below provides a graphic representation of feeder grades. The U.S. Department of Agriculture (USDA) developed feeder cattle grades that evaluate calves for frame size (Figure 2, below) and muscle thickness (see Figure 3, page 14). Unhealthy and double-muscled cattle are placed in the inferior grade. The main purpose of frame size and muscle thickness evaluation is to estimate carcass composition when slaughtered. The following information will help you in selecting an animal of sufficient frame and muscling.

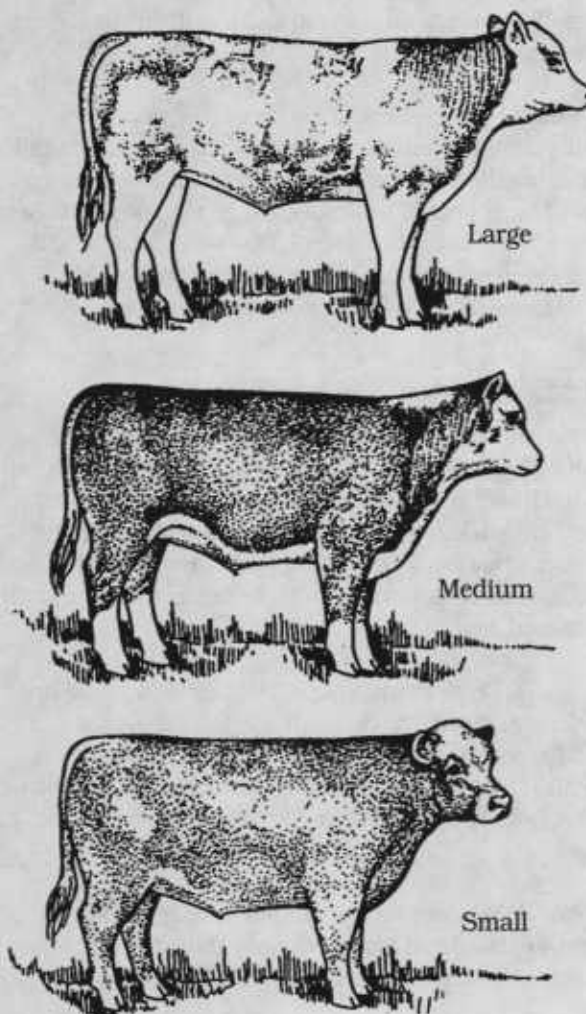


Figure 2. Large and medium frame pictures depict minimum grade requirements. The small frame picture represents an animal typical of the grade.

Frame Size

a. Large Frame—Cattle in this grade are healthy, tall and long bodied for their age. Steers and heifers would not be expected to produce U.S. Choice carcasses (with .5 inch of fat cover) until their live weights exceed 1,200 pounds and 1,000 pounds, respectively. This classification would contain cattle with frame scores of six or greater as described later in this discussion.

b. Medium Frame—Cattle in this grade are healthy, slightly tall and long bodied for their age. Cattle would be expected to produce U.S. Choice carcasses at live weights ranging from 100 to 1,200 pounds for steers and 850 to 1,000 pounds for heifers. This classification would contain cattle with frame scores from three to five.

c. Small Frame—Feeder cattle in this grade are thrifty, small framed, shorter bodied and not as tall as the medium frame grade. Steers and heifers would be expected to produce U.S. Choice carcasses at live weights of less than 1,000 pounds and 850 pounds, respectively. This classification would contain cattle with frame scores of two and less.

Muscle Score

a. No. 1. Feeder cattle in this category generally show a high percentage of beef breeding. They must be healthy and slightly thick muscled throughout. They are slightly thick and full in the forearm and gaskin, showing a rounded appearance over the top and loin with moderate width between the legs, both front and rear.

b. No. 2. Feeder cattle qualifying for this grade are healthy and narrow through the forequarter and middle part of the round. The forearm and gaskin are thin and the top and loin have a sunken appearance. Legs are set close together, both front and rear.

c. No. 3. Feeder cattle included in this grade are animals that have less thickness than the minimum requirements specified for the No. 2 grade.

d. Inferior. This grade includes cattle not expected to perform normally in their present, unthrifty state and those that are "doubled muscled." Cattle in this grade may have any combination of frame and muscle score.

Given the possibilities of the different grades for frame and muscle, there are 10 possible feeder grades:

L-1 = Large Frame, No. 1 muscle thickness

L-2 = Large Frame, No. 2 muscle thickness

L-3 = Large Frame, No. 3 muscle thickness

M-1 = Medium Frame, No. 1 muscle thickness

M-2 = Medium Frame, No. 2 muscle thickness

M-3 = Medium Frame, No. 3 muscle thickness

S-1 = Small Frame, No. 1 muscle thickness

S-2 = Small Frame, No. 2 muscle thickness

S-3 = Small Frame, No. 3 muscle thickness

Inferior = unthrifty and double muscled

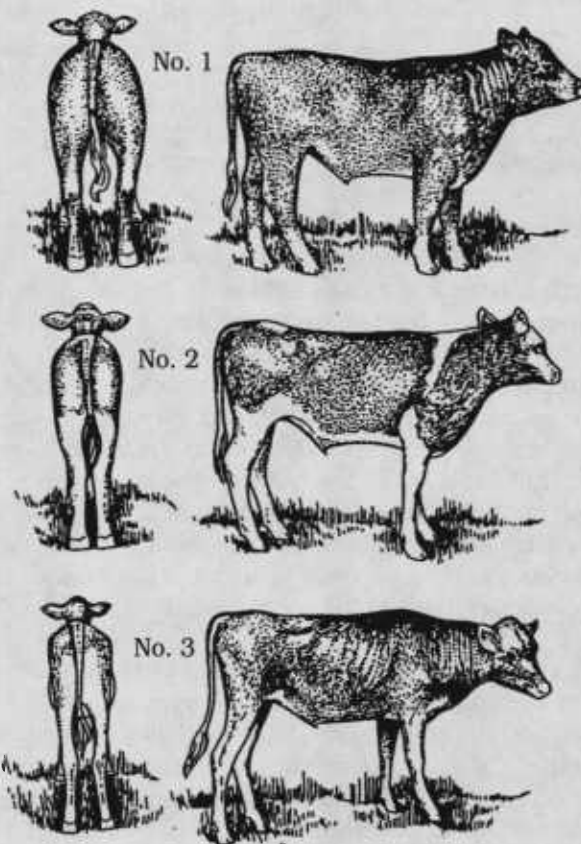


Figure 3. No. 1 and No. 2 thickness pictures depict minimum grade requirements. The No. 3 picture represents an animal typical of the grade.

	Heavy muscling (1)	Medium muscling (2)	Light muscling (3)
Large frame	Large 1		
Steers Choice	(Charolais)	Large 2	Large 3
at over 1,200 lb			
Medium frame	Medium 1	Medium 2	Medium 3
Steers Choice			
1,000 to 1,200 lb			
Small frame	Small 1	Small 2	Small 3
Steers Choice			(Jersey)
at under 1,000 lb			

When you select your market steer or breeding heifer, try to estimate the appropriate feeder grade. This is good experience for the 4-H member and the 4-H leader. A 4-H feeder steer (or heifer) should be medium- to large-framed with long, thick muscling (No. 1). An animal of this muscle description will stand and walk wide both in the front and rear. Muscle holds the skeleton (bones) apart and allows the animal to exhibit this width. It also will exhibit a well-sprung rib and carry considerable thickness down the top. The animal should be sound in skeletal structure and be free moving. It should be neat shouldered and clean about the brisket, sheath, and underline.

An animal should exhibit adequate size for its age. Determining an animal's frame size (hip height in relation to age) can be helpful in estimating finished end weight. To do this, determine the calf's age and height in inches over his rump (hook bones). Determine frame size from Table 2 (below). Use Table 3 (at right) to predict a target finished weight. This will aid you in developing a nutrition program that will produce the desired weight on your animal by exhibition time.

Your market steer or heifer must be heavy enough at the time of selection to reach a desired finished weight before fair. If you have had a market beef project before, use that gain to estimate what your new animal might gain. Project market steers typically gain about 2.5 pounds per day. If you purchased a 450-pound animal 210 days before fair

Table 2. Hip height measurement (inches) to determine frame score* of steers of different ages.

Age (Months)	Frame Score					
	2	3	4	5	6	7
	(Inches)					
6	36.5	38.5	40.5	42.6	44.6	46.7
7	37.5	39.6	41.6	43.7	45.7	47.7
8	38.6	40.6	42.6	44.6	46.7	48.7
9	39.5	41.6	43.6	45.6	47.6	49.6
10	40.4	42.4	44.5	46.5	48.5	50.5
11	41.3	43.3	45.3	47.3	49.3	51.3
12	42.0	44.0	46.0	48.0	50.0	52.0
13	42.7	44.7	46.7	48.7	50.7	52.7
14	43.3	45.3	47.2	49.2	51.2	53.2
15	43.9	45.8	47.8	49.8	51.8	53.7
16	44.3	46.3	48.3	50.3	52.2	54.2
17	44.8	46.7	48.7	50.6	52.6	54.6
18	45.1	47.1	49.0	51.0	52.9	54.9

*Adapted from the Beef Improvement Federation Frame Score System.

Table 3. Estimated slaughter weight when majority of cattle of given frame score reach choice quality grade.

Frame Size	Estimated Slaughter Weight
2	851- 950
3	951- 1050
4	1051- 1150
5	1151- 1250
6	1251- 1350
7	1351 - and above

and wanted a finished weight of 1,150 pounds, your animal would have to gain 3.3 pounds per day—a difficult rate for a 4-H animal to achieve over a span of seven months. You need to consider the following variables when deciding on the initial weight of your prospective feeder calf:

- Number of steers being fed—Research has shown that competition at the feed trough helps increase consumption of concentrates or feedstuffs, thus increasing the pounds gained by the steer.
- Feeding your calf—Starting your calf on feed with a combination of concentrates and roughage is a very important step in beginning your project. Recognize that your calf has come off of summer pastures or other conditions. It is very important to start the calf off with high-quality roughage and a good mixture of concentrates.
- The weather—Steers fed in very hot conditions or in areas where it is cold for long periods usually do not gain at a rate conducive to your time frame for exhibition. When the weather is hot, animals become very inactive. This is due to an increase in the animal's body temperature. You can help reduce the stress associated with high temperatures by providing adequate shelter and access to green pastures. In cold weather, animals will eat more feed and exercise more frequently, resulting in the production of more body heat and reducing the amount of weight gained.
- The selection of a steer or heifer that exhibits growth potential—Select a calf that is modern in type. Your calf should be long bodied, trim, well balanced, and muscular in nature. The calf should exhibit the typical characteristics of a calf that will grow: long, extended cannon bone; minimal amount of finish (fat); a strong skeletal structure; and muscle adequate for the calf's age, frame, and weight.

Every breed has some superior as well as inferior animals. Unless you are involved in a purebred operation, do not let breed considerations overrule the selection of the top calf from some other breed or a crossbred calf. Many of today's top calves are crossbred and combine desirable characteristics from two or more breeds. A good source of calves is a herd of cattle that has been on a performance testing program for several years. One usually can find steers in top commercial herds that have used

outstanding bulls even though they may not have actual performance records.

Learn the parts of a beef animal. This makes for a good club or group activity. Make a large drawing of a beef animal on the blackboard or on a piece of cardboard, then number the parts. Identifying the parts can be a game, played during a meeting. The game leader calls a number and points to a member. The member must name the part of the animal with that number.

Figure 4. Know the Parts of Greatest Value

Higher value wholesale cuts

1. Loin
2. Rib
3. Round
4. Rump

Lower value wholesale cuts

5. Chuck
6. Brisket
7. Flank
8. Plate
9. Shank
10. Neck

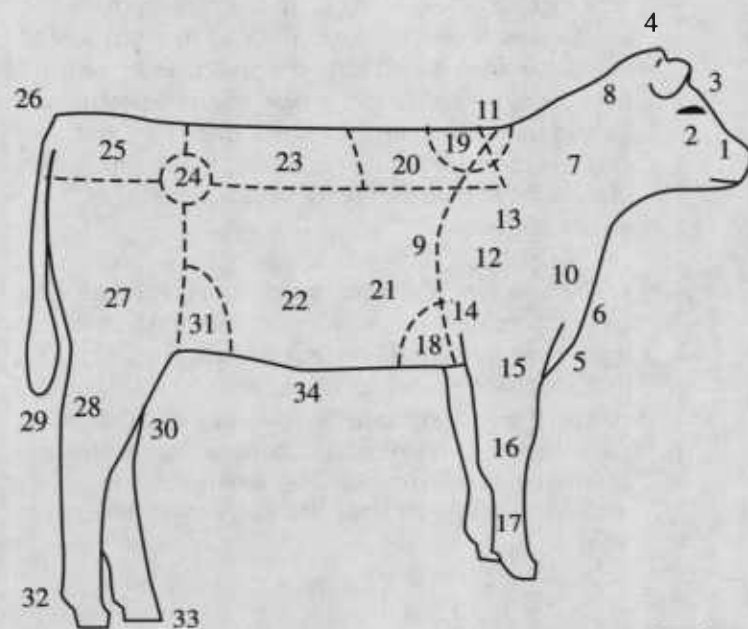
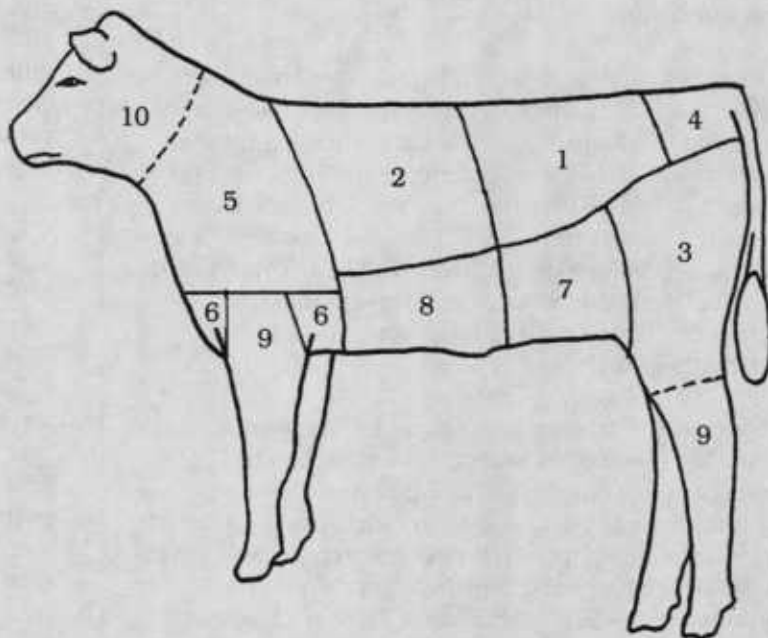


Figure 5. Parts of a Beef

- | | |
|-----------------------|-------------------------------------|
| 1. muzzle | 19. crops |
| 2. face | 20. back |
| 3. forehead | 21. ribs |
| 4. poll | 22. paunch or belly |
| 5. brisket | 23. loin |
| 6. dewlap | 24. hip or hook |
| 7. neck | 25. rump |
| 8. crest | 26. tailhead |
| 9. forerib | 27. thigh or round |
| 10. point of shoulder | 28. hock |
| 11. top of shoulder | 29. switch |
| 12. shoulder | 30. testes, cod, or udder |
| 13. shoulder vein | 31. hind flank |
| 14. elbow | 32. dew claw |
| 15. arm | 33. hoof |
| 16. knee | 34. sheath (bull) or pizzle (steer) |
| 17. shank | |
| 18. fore flank | |

Caring for a Newly Purchased Calf

Handle your calf with gentleness and care. Move slowly and gently when working around your calf. Speak softly to help it settle down and become accustomed to you. You should keep the calf in a small lot where you can observe it often for several days after arrival. Make sure plenty of clean, fresh water and hay is available. If your calf has not been dehorned and castrated, you should delay this for two to four weeks after purchase. Before performing these operations, make sure your calf is eating well and is strong and healthy. Ask your veterinarian or the seller if additional vaccinations are necessary. Health practices should be carried out at the proper time.

Make sure that your calf is not stressed in any way and that it has an opportunity to eat and rest. A dry, well-ventilated stall in a barn or a shed will furnish adequate shelter. This will provide warmth and protection from snow and rain during the winter. The stall, or shade from trees, will help to keep your animal cool during hot summer weather.

It is a good idea to break your calf to the halter before you start it on full feed. When tying your calf to break, do not tie the rope to an object higher than one foot from the ground. Should the calf hang back and throw itself, having it tied low will prevent choking. When breaking the calf to lead, you may need additional help from your parents or other adults. Make sure that the halter and rope are strong enough that the calf will not break them.

Use safe procedures when breaking your calf to lead. Do not put yourself between the calf and a fence or near the rear flank area as you might get kicked. Wear boots, long pants, and gloves—preferably leather—when working with the calf. Seek out advice and assistance from an experienced 4-H member or 4-H leader before undertaking this for the first time.

Feeds and Feeding

Your feeding program should allow your calf to reach proper weight and finish by the time it is to be shown. Record your feed costs accurately so that you know just how economically you are producing beef. Food nutrients for animals—as for humans—are classified as proteins, carbohydrates and fats, minerals, vitamins, and water. You can get commercial feeds to adequately grow and finish your project animal, and if home-grown feeds are available, you

may use them after considering the necessary food nutrients.

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

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

Vitamins are necessary for health and good growth. Green pasture, alfalfa hay, and well-cured grass hay are good sources of carotene, which the animal's digestive system converts into vitamin A. High-quality roughage, such as alfalfa hay or bright grass hay, is a rich source of vitamins and protein. Cattle that are fed dry, bleached-out feed may be deficient in vitamin A. Signs of vitamin A deficiency include watery eyes, rough hair coat, night blindness, and poor gains.

Because vitamin D is formed by the action of sunlight on plant and animal tissues, animals that get plenty of sunshine are less likely to have a vitamin D deficiency than animals that are confined to a barn or stall.

Minerals are supplied partially through high-quality roughage and grain. It's a good idea to supplement your animal's diet with minerals in addition to those contained in ordinary feeds.

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 your animal has adequate mineral supplementation, provide a box or trough in the stall or lot.

Trace-mineralized salt is available in most areas and, when fed to your animal in very small quantities, will provide the necessary trace elements. Trace minerals include copper, iron, iodine, cobalt, manganese, selenium, and zinc. Your county Extension agent or leader can help you determine the proper mineral supplementation.

Make sure plenty of clean, fresh water is available to your animal at all times. Water is necessary for blood volume and acts as a solvent and cooling mechanism. Water constantly is being lost from the body through evaporation from the skin, through breathing, and by waste elimination of urine and manure. In hot weather, a mature beef animal may drink more than 20 gallons of water per day. An ideal temperature for water is from 45 to 50° F. Do not allow water to freeze during the winter. Keep plenty of water available.

As a general rule, a calf will eat about 3 pounds of dry matter for each 100 pounds of its body weight. If it gets no other feed, a 500-pound weaned calf will eat about 15 pounds of high-quality alfalfa hay. Assuming that your calf has never tasted grain, it may take several days to get it started. Creep-fed calves are more easily started on a feeding program after weaning.

Roughages include hay, pasture, and silage—substances relatively low in digestible nutrients. Concentrates are grain and protein supplements that are concentrated sources of digestible nutrients. To encourage adequate growth (and to avoid making heifers too fat), breeding cattle should have a minimum of grain and a maximum of high-quality roughage. A steer whose market weight will be 1,050 to 1,250 pounds must be fed a high proportion of concentrate during the last 4 to 5 months of the finishing period in order to grade USDA Choice.

In the Pacific Northwest, barley is one of the most available concentrate feeds. It can substitute for or interchange with corn, milo, or wheat. Because wheat is used primarily for human food, it usually is priced above other feed grains. When the price is low, however, wheat is a satisfactory feed for cattle. Wheat should not constitute more than 50 percent of the ration.

Barley, corn, milo, and wheat should be coarsely ground, cracked, or rolled for optimum live animal performance.

Oats, which are fairly high in protein and, because of the hull, rather bulky, are very satisfactory feed for growing calves. Although calves younger than three months sometimes are fed whole oats, it is advisable to roll, coarsely grind, or crimp this grain in order to improve animal performance.

Molasses-dried beet pulp is slightly lower in feed value than barley. It is a succulent feed which helps prevent bloat when included in the ration with grain. The recommended proportion of roughage to concen-

trate in the ration depends on the age and size of your calf, and whether it is a steer being finished for market or a heifer being grown out for breeding purposes.

The most common protein supplements are cottonseed meal, linseed meal, canola meal, and soybean meal. The need for a protein supplement decreases if high-quality alfalfa is included in the ration. You should provide protein supplements if you are feeding your animal non-legume roughage such as a poor-quality grass hay. A 600-pound calf needs about 1 1/2 pounds of crude protein per day. Your 4-H leader can help you balance the ration. Refer to *Cattle Producer's Library* (CL) Publication 2005 for more information. For additional information on feeding, refer to CL Publications 300 and 315.

Remember, when concentrates make up most of the ration, and roughage only a small part, the calf will gain fast. This usually is the situation during the last part of the feeding period. If most of your animal's ration is hay, with only a small amount of concentrate, its gain-per-day will be fairly low.

Some general rules:

- Feeding your calf from 500 to 650 pounds to gain 1 1/2 pounds per day—feed 45 percent concentrate and 55 percent hay.
- Feeding your calf from 650 to 800 pounds to gain 2 pounds per day—feed 25 percent concentrate and 75 percent hay.
- Feeding your calf from 800 to 1,250 pounds, you probably will want it to gain as rapidly as possible. To do this, feed it from 2 to 4 pounds of hay per day (no lower than 10 percent of the total ration) and about 2 to 3 percent of its body weight as grain.

Finishing Rations

Finishing rations need not be complicated. Concentrates can be mixed at home.

Example 1

Rolled barley	80%
Oats	9%
Alfalfa-grass hay	<u>11%</u>
	100%

Example 2

Corn (rolled or ground)	84%
Alfalfa-grass hay	10%
Soybean meal (44% protein)	<u>6%</u>
	100%

Example 3

Wheat (rolled or ground)	45%
Barley (rolled or ground)	45%
Alfalfa-grass hay	<u>10%</u>
	100%

Feed your calf according to the specifications listed below.

Amount of Feed, by Calf's Weight

Calf Weight	Concentrate	Roughage
	Pounds	Pounds
500 pounds	5 to 6	7 to 8
600 pounds	8 to 11	7 to 8
700 pounds	12 to 15	6 to 7
800 pounds	15 to 19	5 to 6
900 pounds	18 to 23	2 to 5
1000 pounds	20 to 27	2 to 4
1100 pounds	20 to 30	2 to 4
1200 pounds	22 to 32	2 to 4

Feed Additives

Many commercial companies produce or use materials that aid animal performance. Feed additives often help prevent acidosis (upset stomach), sickness, and other complications associated with feed consumption. Such additives can be a big help and should be used carefully and in accordance with label specifications. Read the label or feed tag to be certain you follow the USDA use guidelines. Animals should be withdrawn from certain feeds prior to county fair—some 60 to 90 days before slaughter. Again, plan the change of feed as directed.

Implants placed in the ear of the animal are safe and help an animal grow faster. Again, follow the directions on the label. You need to do the last treatment or implant about 100 days before county fair—mark this day on your calendar so you don't miss it!

These products are some of the many management tools that can help make your calf economical and efficient at the feed bunk.

The Digestive System

In order to feed your animal properly, you should have some understanding of its digestive system. The term "digestion" includes all the changes food undergoes in the digestive tract to prepare it for absorption and use in the body.

Cattle are classified as "ruminants," mammals having four stomach compartments and chewing a

"cud" (regurgitated, partially digested food). When ruminants are eating, they chew their food only enough to moisten it, if it is dry, and to form it into a mass suitable for swallowing. On being swallowed, this food mass passes into the rumen, where it is softened. When a ruminant has satisfied its appetite, it seeks a quiet place, if available, and proceeds to ruminate, or "chew its cud." In this process a mass of solid food, along with liquid, is carried from the reticulum and the rumen into the esophagus where it is forced up to the mouth. The animal then quickly swallows the liquid portion and thoroughly chews and again swallows the solid part (see illustration). Most of the food then goes on to the omasum (the third stomach). When the omasum contracts, water is squeezed out and feed is forced into the abomasum (the fourth stomach).

As feed continues through the digestive tract, muscle contractions in the digestive organs push feed along the tract.

Cattle's appetite 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.

Here is how long it takes feed, in a normal ration, 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 portions of the digestive tract, the time is even longer.

Stomach Compartments

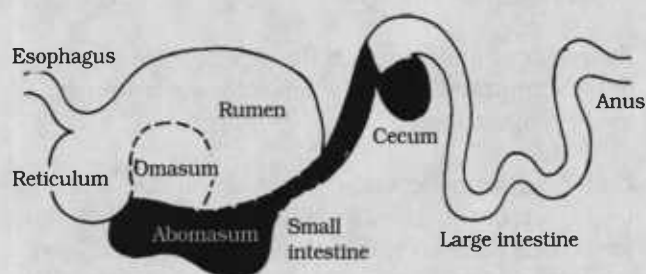
The ruminant stomach consists of four distinct compartments: the rumen (or "paunch," as it is commonly called); the reticulum (or "honeycomb"); the omasum (or "manyplies," so called because of the plies or folds); and the abomasum (or "true stomach").

The rumen, at birth, is a very small organ found in the upper left area of the abdominal cavity. According to research findings, the rumen develops in a series of fairly definite stages. When the animal is about 2 months old, the rumen descends to its normal position in a mature animal. The reticulum

and omasum grow rapidly during this first 2-month period. During the first 3 months, the rumen enlarges and develops the physical characteristics found in a mature animal.

In young ruminant animals (1 to 3 months), 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 stomach's other compartments develop and the young animal starts to consume more solid or dry feeds.

Figure 6. Essential Parts of a Ruminant Stomach



This example, showing the capacities of the four compartments of the bovine stomach, gives you an idea of the tremendous size of the ruminant digestive system. The ranges shown allow for different animal breeds and ages.

Rumen:	20-48 gallons
Reticulum:	1-3 gallons
Omasum:	2-5 gallons
Abomasum:	<u>2-5 gallons</u>
Total stomach capacity:	25-61 gallons

Following are some basic differences in the digestive systems of ruminant (cud-chewing) animals such as cattle and sheep, and monogastric (having only one principal digestive cavity) animals such as swine and chickens:

- 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 in utilizing crude fiber than that of the monogastric animal. The efficiency of the ruminant digestive system is illustrated by these figures, showing the extent of crude fiber digestion of alfalfa hay by four different animals:

Cattle:	44%
Sheep:	45%
Horses:	39% (mainly in the cecum)
Swine:	22%

A ruminant's ability to use great amounts of roughage depends almost entirely on the microbial reactions taking place in the rumen compartment of the stomach and, to a lesser extent, in the intestines. Thus, the difference in rations.

You should consider several points on feeding:

- Start calves on grain slowly and gradually increase the amount fed.
- Feed at the same time each morning and evening. Grain rations should be divided equally between feedings.
- For the concentrate part of the ration, do not feed more than 2 percent of the animal's body weight.
- Keep feed box clean. Remove uneaten feed from trough or feed box.
- Keep cattle clean, dry, and comfortable.
- Weigh your calf occasionally so you will know if its gains are satisfactory.
- Avoid dusty, spoiled, or moldy feed.

If during the feeding period you run into any problem or need advice, do not hesitate to call your 4-H leader. As mentioned earlier, feeding two calves in the same pen promotes competition; usually they will eat more readily than when alone. Exercise also helps stimulate a calf's appetite. When your calf has been taught to lead, take it for a walk one-fourth to one-half mile each day. This also will make it easier for you to handle the animal when exhibiting at a fair.

Management of Cows and Heifers

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 the percent of calf crop, the weaning weight of calves, the cost of maintaining breeding animals throughout the year, and the value of sale animals. The feeding and management of cows and heifers influence the percent of calf crop and the weight of calves at weaning time.

Heifers weighing 65 percent of their mature weight (650 to 800 pounds at 14 months of age) should calve by 24 months. 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 your breeding animals in thrifty condition—not too fat or too thin—so they will be productive for a long time.

The gestation period—the length of time from when the cow is bred until she drops her calf—is about nine months. Start observing your cow several days before the expected time of calving. A small pasture near the house is an excellent place to keep a close watch, especially on a heifer calving for the first time. Heifers may experience some difficulty so they should be watched very closely as calving time approaches. If your heifer has been in labor for more than 2 or 3 hours, you should call your veterinarian, 4-H leader, or another person experienced in calving first-time heifers.

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. She should be bred again about 60 days after calving.

It usually is not necessary to give cows additional feed if they are grazing improved or native pastures where forage is plentiful. If cows calve before grazing season begins, they need all the hay they can eat on a free-choice basis.

Creep Feeding

Creep feeding usually is done by placing feed in a self-feeder. The self-feeder should be located in a lot with a fence to keep older cattle out but with an opening for calves to pass through. Creep feeding helps calves if the feed is dry or in short supply, but

usually is unnecessary when the mother cow is grazing good pastures. 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. As calves approach weaning time, they will eat from 4 to 6 pounds of creep feed per day, depending on the quality of available pasture and the amount of milk received from the dam.

Weaning

Calves usually are weaned at 8 months of age. Earlier weaning may be profitable if the pasture is dry and in short supply. The easiest way to wean a calf is simply to separate it from its mother, and provide plenty of clean, fresh water with ample free-choice hay and some grain. If you creep feed prior to weaning, the calf will wean off easier and start eating when separated from its mother. Calves born in the fall benefit from creep feeding especially if the winter that follows is severe and cold, and there is limited natural forage.

Records of Performance

Modern technology has changed the way we measure performance of our project animals. We can use these tools (including computers) to (1) measure change in our project animals, and (2) aid in the selection of animals.

Breeding Project

Four measurements indicate the profitability of a cow herd:

- Fertility—Measured by the number of “open,” or nonpregnant cows in the herd.
- Death loss—The amount of death loss affects profit.
- Length of calving period—Indicates how cows respond to their environment
- Growth rate of calves—Also affects profit.

You should keep records of your cow's breeding dates, calving dates and weaning dates. You also should record birthweight, weaning weight, and yearling weight, and calculate average daily gain. Other records could include calving ease, frame score and various carcass traits. Cow record sheets are available through your county Extension agent, 4-H leader, or local breed association.

Breeders use records of performance to select replacements, merchandise cattle, and understand how offspring are expected to perform. Most breed associations print an annual sire summary to report EPDs (expected progeny differences), which indicate how the average offspring from animals should perform. These can be used to compare the expected growth of two or more different animals.

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 usually is the most profitable.

Another performance characteristic you should record is the calf's growth rate after it is weaned. Generally, large calves eat more than do 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.

Carcass merit is another characteristic of economic importance. USDA Choice is the quality grade most preferred. Most of the beef industry prefers a yield grade 2 (high muscle and low fat). Such carcasses command a higher price than those of lower quality, or those that are too fat.

Market Project

The performance measures of market animals are primary gain or growth, show ring placing, and carcass traits. Gain is easily calculated as beginning weight minus fair weight, and is estimated when selecting animals. Most county fair groups report the carcass data, and you should share this data with the breeder of the animal(s).

In summary, total performance records tell you how cattle produce. Keeping records takes time but it pays off by identifying the most productive animals in the herd.

Equipment and Facilities

Workable and practical equipment makes cattle handling easier and safer, with less waste of time and labor. It helps you do a better job. The equipment shown in this publication will give you some idea of what is simple and practical.

Although fences may not be considered equipment, they are necessary. Besides controlling livestock, fences make impressions on other people. Keep your fences in good repair. Place the feeding area in a well-drained location convenient to your feed-storage facility. Keep drainage away from feed areas and driveways. The best location is a hillside with feed alleys and managers extending along the high side. The least width or depth of the lot should run down-grade. If you have more than one animal and they all eat at the same time, allow a bank space of 22 to 28 inches per animal. If you keep feed continuously before animals, 12 inches per animal is ample.

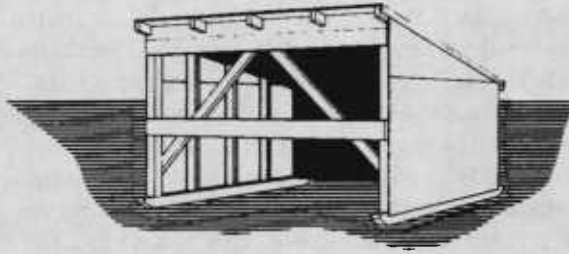
An inexpensive feed trough can be made using 2-inch lumber cut into lengths to accommodate several calves. Allow about 3 square feet per head and make sides not less than 6 inches deep. If mounted off the ground, keep the height at about 18 inches.

The illustrations on the following pages show how a feed bunk can be covered for use in feeding one calf or several head of beef cattle. Covered bunks protect feeding equipment and keep moist feed from drying out and dry feed from getting wet.

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 feeding leafy hay. Shattered leaves are caught in the trough below the hay rack and are not wasted.

Your calf needs plenty of fresh, clean water. As you begin your project, you can provide water in the shed or stall by using a heavy metal bucket. Set the bucket on the floor in a corner of the stall and hold it in place with a board nailed across the corner. (Figure 7 on page 23 shows a well-made portable calf shelter.)

If you are feeding more than two calves, you may need a larger waterer. You can make an inexpensive trough by cutting a wooden or metal 55-gallon barrel in half to make two troughs that will hold about 25 gallons each. You must clean the half-barrels thoroughly before each use.



Bill of materials

No.	Description	No.	Description
2	4x4 x 9' skids	4	4x8 x 5/8" ext plywood
17	2x2 x 5' studs	4	26" x 10' metal roofing
5	2x4 x 9' rafters	8	1/2" x 6" bolts
4	2x4 x 6' braces	4	16" pull chains
5	1x6 x 8' boards	16 lbs	20d framing nails
8	1x2 x 18" filler boards	6 lbs	6d galv nails
1	2x6 x 8' guard rail	2 lbs	galv roofing nails

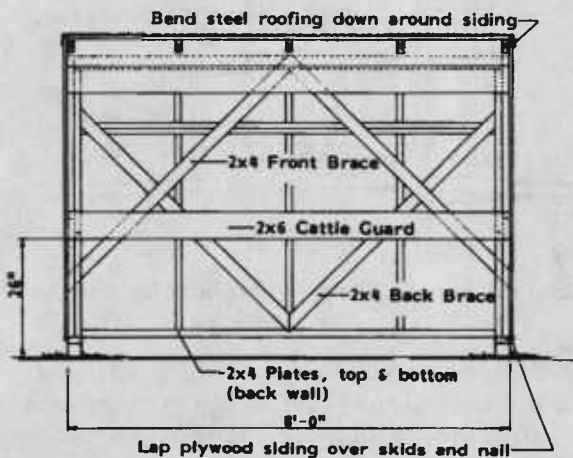
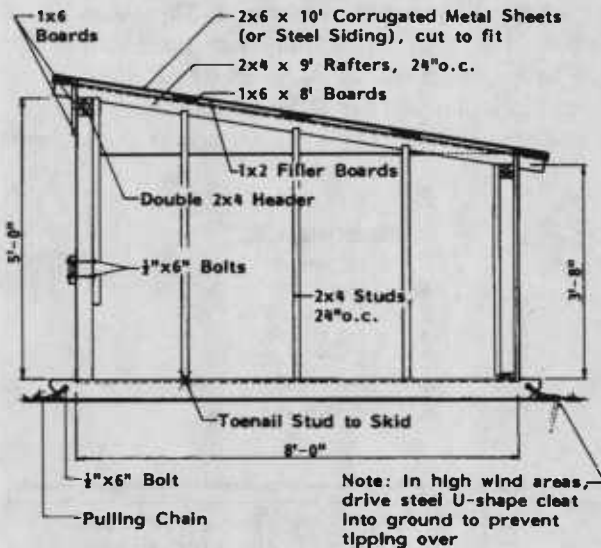


Figure 8. 8'x8' portable calf shelter.

cation and treatment or prevention of some common health problems.

Blackleg is an infectious disease caused by bacteria living in the soil. The soil on many ranches harbors this organism, and when conditions are right, cattle become infected. The onset is sudden, and most affected animals die. Signs of this disease are lameness and severe depression.

Calves should be vaccinated at about 2 months; a second dose of vaccine around weaning time offers additional protection. Other soil bacteria may cause problems in your area; check with your veterinarian regarding vaccines. 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. Oregon 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 to a fair or show is another form of stress; the feeding regimen is disrupted and calves are exposed to virulent, infectious agents to which they are not accustomed.

Calves should be vaccinated against common viral agents such as IBR, PI3, BVD, and RSVP (the most common viruses causing respiratory disease). It is advisable to vaccinate calves before stress periods, with immunization completed at least 3 weeks before showdate or fair time. In other words, the initial dose plus the booster dose (2 to 3 weeks apart) should be done 3 weeks before expected stress times. You can get vaccines from your veterinarian or from a local feedstore.

White muscle disease is a serious problem in cattle around Oregon. It is caused by a deficiency in the cattle's diet of the trace mineral selenium. It may result in paralysis of the skeletal muscles (calves are paralyzed, unable to rise). It may affect the heart muscle and cause respiratory distress and, within a few hours, death.

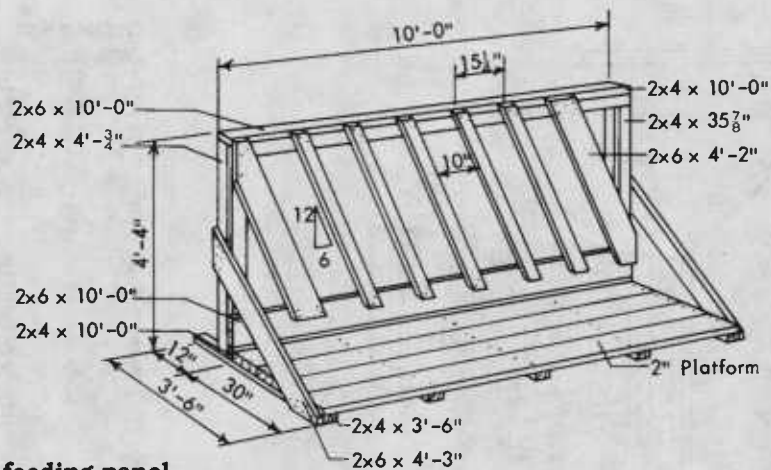
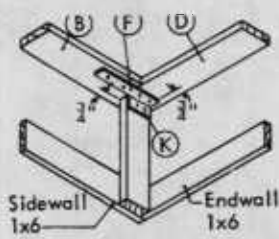
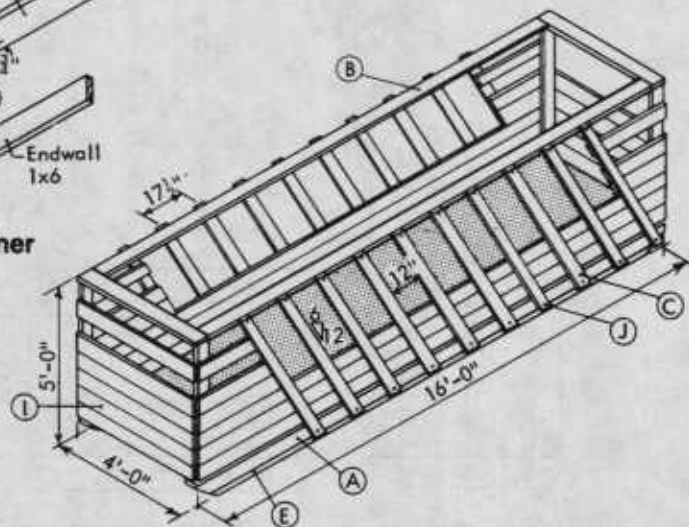


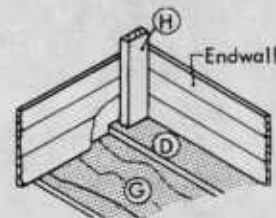
Figure 10. Portable feeding panel.



Top Corner

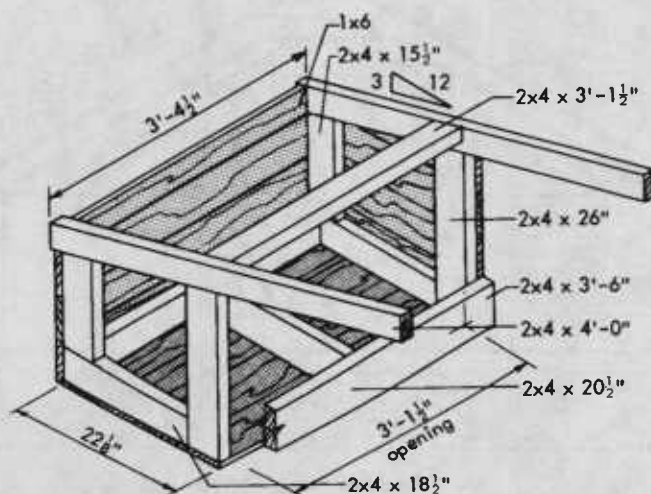


Cutting List		
Item	No.	Description
A	2	4x4 x 16'-0"
B	2	2x6 x 15'-3/4"
C	20	2x4 x 5'-9"
D	4	2x6 x 4'-0"
E	2	2x4 x 16'-0"
F	4	2 1/2"x2 1/2" x 1/4"x12" angle
G	2	3/4"x4"x8' C-C ext plywood
H	4	2x4x4'-4 3/4"
I	232 ln ft	1x6
J	40	3/8"x4" lag screw
K	24	1/2"x2 1/2" bolt



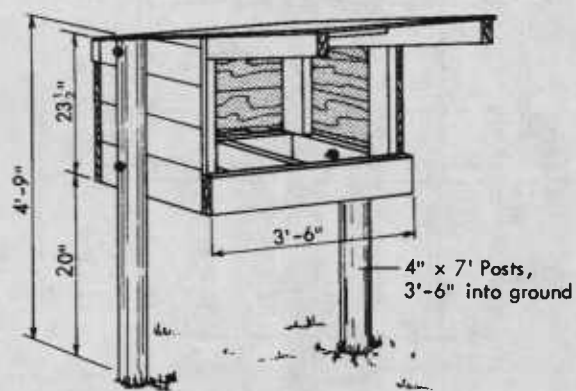
Bottom Corner

Figure 11. Wooden hay and silage feeder.



Framing

Figure 12. Stationary mineral feeder.



The occurrence of this nutritional disease is spotty, depending on soil composition, fertilization, and farming practices where forages are produced. Losses from this disease are common on farms in western Oregon.

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.

A selenium deficiency also may keep a growing calf from developing fully, and it may depress the immune system enough to increase the risk of infectious diseases such as pneumonia and diarrhea. You should supplement selenium in the feed whenever a deficiency is likely. Consult your veterinarian to determine whether you need to supplement.

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 calf, begin treatment immediately as it will require at least 1 month for hair to grow back. Treatment should include a thorough bath with a detergent, which will wash out many spores and help stop spread. Following the bath, a rinse with 1 percent Captan will kill most established fungi. You may apply other fungicides, such as iodine or iodine-glycerine mixture, to the infected skin area. Ringworm is an infectious disease and calves may be banned from show rings when showing signs of the disease. Additional information on ringworm can be found in the fitting and showing section of this manual.

Bloat in cattle is a digestive disturbance, with accumulation of gases in the rumen. It causes discomfort; in acute cases, death may occur in a matter of minutes. A variety of feeding conditions may cause bloat. Legume pastures often are involved when bloating occurs; keep coarse hay before animals on legume pasture. Heavy grain rations also can cause trouble in the feedlot.

To relieve slight bloat, try walking the animal. Antifoaming agents, given by stomach tube, usually relieve bloat. If bloating occurs consistently, the daily feeding of small amounts of poloxalene will

prevent it. If bloat occurs and you are unable to relieve symptoms by walking the animal or passing a stomach tube, immediately call your veterinarian.

Scours in young calves are common and can be caused by a number of conditions. Consuming too much milk will cause some calves to scour. Generally, this will not be serious and often will correct itself spontaneously.

There are many infectious agents that affect calves' intestines, causing a high percentage of calves to scour and even die. 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. Also, keep calves warm and dry; exposure to cold and rain causes stress and contributes to scouring.

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, are ideal conditions for the spread of footrot.

To treat footrot, first trim the hoofs and remove all dead tissue. Then soak the feet in a bath of saturated solution of copper sulfate. Repeat after 4 to 5 days, if necessary. Several antibiotics, including penicillin, also are useful for treatment. Discuss effective control measures with your veterinarian.

Warts are skin growths caused by virus infections. There is no known effective treatment. Autogenesis vaccines (self-produced vaccines), have been successful when given before signs of warts appear. Consult your veterinarian if warts develop.

Insects and Parasites

Flies not only bite and suck blood, but are a tremendous annoyance to cattle. Cattle seeking relief from flies spend considerable time in shade or in places of protection and, as a result, 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. Eliminating such breeding areas is the first step in control, and spraying cattle and buildings regularly with recommended chemical insecticides will enhance control.

Face flies are difficult to control and may require application of spray or dust every 3 to 5 days. You can treat individual animals by dusting them with 1 percent ciodrin or 1 percent Co-Ral (both available at farm stores). Self-applicating devices such as dust bags, back-rubbers, and insecticide eartags are useful when treating a large number 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 lice when cattle rub excessively against fences, trees, etc., and when bare spots show up, especially on the rump, rear quarters, neck, and shoulders. You may notice 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 (contact your county Extension agent for recommendations). You may need to spray twice, 10 days apart. If lice appear in the winter, you can spray when favorable weather permits, using an oil-base solution instead of water base.

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. Cattle's favorite type of relief from warbles is to wade into deep water and stand or seek deep shade for long periods of time.

The fly eggs hatch and the larvae penetrate the skin and migrate to the back of the animal, where they remain about 5 weeks before leaving their host and dropping to the ground, ultimately to become adult flies and repeat the cycle. Larvae are particularly damaging to carcass and hide. Breaking a grub under the skin can cause an abscess and extreme shock.

You can detect grubs by feeling for bumps along the animal's back. Each bump will have a hole in the skin, through which the grub obtains air and eventually emerges. When you can feel the grubs, it's too late to treat them.

Grubs can be controlled, however, by treating cattle with compounds such as Co-Ral, Neguvon, Ruelene, Tiguvon, or Warbex (available from your veterinarian or farm store) after the heel fly season in the fall. Ivermec is effective in removing migrating larvae. Use

the injectable form of the drug for treating grubs. Other 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. When your veterinarian is on a routine visit to your place, ask for recommendations on these problems.

Cattle are likely to pick up roundworms and liver flukes when they graze established irrigated pastures. A subsequent invasion of the stomach or intestinal wall causes improper functioning of the affected organ. Signs of damage include scouring, rough hair coat, and potbellied appearance. Administration of anthelmintic, a worm remedy, can greatly improve livestock performance. Solicit advice from your veterinarian.

Basic Instruments and Tools for Maintaining Animal Health

One of the most useful instruments for disease prevention in cattle is a vaccinating syringe. Syringes vary in construction and size. One of the handiest syringes for vaccination is the 25cc metal syringe with glass barrel and rubber plunger. A 16 or 18 gauge needle, 1 inch long, is recommended. Immediately before using the syringe, sterilize the entire instrument in boiling water. You may use mineral oil on the rubber plunger. After use, take the syringe apart. Wash in clean, soapy water, then rinse, dry, loosely reassemble, and wrap in clean paper or cloth for storage.



Figure 13. Disposable syringe.

Disposable syringes are more common and can be purchased from your local feed store or pharmacy. When done using a disposable syringe and needle, point the needle down on a hard surface and bend it enough so that it is no longer usable, then carefully dispose of the entire syringe and needle.

A drenching gun is useful for administering medicine orally in liquid or paste form. Many beef producers now administer such medicines and wormers using a paste material dispensed via a tube much like a caulking tube. The medicine must be placed far back in the mouth to keep the animal from spitting it out. The size of the animal determines the dosage used.



Figure 14. Drenching gun.

Management Practices

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 long enough to prevent their carrying blood-borne diseases, such as anaplasmosis, from one animal to another.

Castrating

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

Before starting the operation, disinfect your hands, the knife, and the area around the animal's scrotum.

The first method is to slit each side of the scrotum parallel to the middle line. The incision is made on one side, and the testicle removed from that side before the incision is made on the other side. The incision is made 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, the scrotum is pulled away from the body and about the lower one-third of the bag is cut off. This leaves the testicles exposed so they can be removed by pulling away from the body. The cords are cut close to the body by simply scraping the cord with a sharp knife blade.

Calves also can be castrated by taking the testicle out the back or front of the scrotum. If you use this method, you need to take extra precautions against infection because drainage is less effective than with other methods. Older calves often are castrated by using mechanical pincers called a Burdizzo.

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

After the calf has been castrated and properly disinfected you can return him to his mother. Provide the calf with a clean area such as a grassy pasture or a well-bedded stall so he can lie down without becoming contaminated.

Tattooing

If you are raising registered cattle you must include tattooing as a part of your management practices. You can get tattooing instruments and ink from your breed association. Instructions for use are included with the package. Clean your hands, equipment, and the ear to be tattooed. Apply the tattoo so that the numbers are between the ribs of the ears. After the tattoo has been pressed into the ear, rub ink into the small holes using an old toothbrush. Dip the brush into the ink, then rub it over the tattoo in the ear.

Dehorning

Many cattle breeds are horned. It is now common practice to dehorn steers to prevent their bruising other animals. You can do this fairly simple operation when the calf is less than 1 month old, or you can do it later, but you should do it before weaning. Most commercial cattle producers dehorn, castrate, and give some vaccinations to their cattle all at the same time. If you have someone helping castrate your calf and the calf needs to be dehorned, you could do these two operations at once.

A caustic potash paste is useful for dehorning calves from 1 to 4 weeks old. For best results, apply caustic potash 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. You can apply petroleum jelly or salve to prevent irritation of the skin adjoining the treated area. You should have experienced help when dehorning your first animal.

Foot Trimming

Ordinarily, calves under a year old do not need to have their feet trimmed. If your cattle stand on a soft surface, however, you may need to trim their feet before they go to a show. The best way to accomplish this is to take several animals to a central location for a 4-H work day. Someone skilled in foot trimming can show you how to do it. Trimmers usually "sculpt" the hoofs with a high-speed sanding disc. Use care when working with such equipment this close to the feet and hoofs. Trim feet at least 3 weeks but not more than 2 months prior to the show. If trimmed rather closely, the feet need time to toughen up so the calf does not appear lame in its leg movements. Properly done, hoof trimming will help your calf stand as squarely and correctly as possible.

Fitting and Showing

For many young people, show cattle preparation is one of the most motivating segments of the cattle industry. The process of caring for and preparing an animal for the show ring certainly motivates a young person to be competitive and to strive for creative perfection. It also is an excellent way to learn about animal behavior and animal anatomy. Fitting helps you see an animal's good points as well as its imperfections—which can be corrected or overshadowed by applying some specific fitting techniques.

Fitting really can change an animal's appearance. Since all animals have different fitting needs, all are prepared differently. If you understand basic conformation and apply specific fitting practices you can make a winner.

Today's show ring trend is toward large-framed, clean-made, eye-appealing cattle. Breeding cattle must display high volume, angularity, growthiness, muscle length, and muscle volume, and a straight-lined, eye-appealing profile. Steers need to be clean, well balanced, expressively muscled and thick topped, and must exhibit efficiency.

There is no "right way" to fit a beef animal. Just as styles change, so do fitting methods. It takes a great deal of time to become an accomplished fitter. You'll need practice, patience, and an open mind toward new fitting techniques. You will become a better

fitter by listening to and watching others, and by being willing to try new ideas.

New ideas can always be adapted for your specific needs. An accomplished fitter can make an animal look very natural and appealing. The ideas and tips presented here are a basic outline, intended to encourage you to develop your own fitting techniques.

Showing and fitting cattle can be fun and rewarding. Honesty and integrity play a big role in the show ring game. There are plenty of unethical fitting methods, but it is important to be creative and honest, and to show your cattle to the best of your ability.

Going to shows gives you the opportunity to meet and exchange ideas with people. Listen to others for ideas, then adapt what you learn for your own needs. Following is a step-by-step process for preparing your animal for exhibition.

Halter Breaking

- **Minimize stress for all concerned.**
- **Properly adjusted equipment combined with consistent and quiet techniques make it easy.**

Use a rope halter (preferably nylon, 1/2 to 5/8 inch in diameter) with a long lead. Adjust and place the nose piece high on the face and close to the eyes. This prevents slippage, gives you maximum control, and minimizes injury to the animal.

Let the animal drag the halter for a few days prior to tying for the first time. The animal will learn to "give" to the pressure when it steps on the rope repeatedly.

Tie the animal first in a safe, confined area where you can easily catch it and tie it to a solid post. It is easier to snare the rope with a show stick.

Tie at eye level and about 12 inches from the post; higher or lower can create pressure on the spine and hind legs, causing a potential spine or muscle injury.

Tie for a short duration—15 to 20 minutes the first few times. As soon as the animal "gives" to the halter or wears out, turn it loose. Release the calf calmly and don't let it jerk the rope from your hands. Create a situation of early respect and you will be rewarded later.

Begin touching the animal as soon as possible.

Use a show stick. It is less intimidating and allows you to be further away. The show stick is

used as follows: To move a foot backward, press high between the toes with the end of the stick. To move a foot forward, hook the back of the outside dewclaw and pull forward. Always use the show stick to place the calf's hind feet. Also use your show stick to place the calf's front feet.

Next, place your hands on the animal and move your body as close to it as possible. Be firm and move slowly and deliberately. It is essential at this point to be patient and calm.

When teaching to lead, use the "pull, release, and reward" method. Accept only a few steps as progress, and reward by releasing the pressure on the halter and speaking to the animal. Voice reward is very important. Again, be patient and calm.

Start teaching the calf to lead as soon as it is used to the halter. Never start later than two weeks after the calf is halter broken. The older and larger the calf, the more difficult it is to train to lead.

When leading the calf, walk on the left side of the animal and hold the lead strap in your right hand. Keep the calf under control with its head up so that its top line will appear level as it walks.

As soon as the animal is controllable, take it to the wash rack. Rinsing with water seems to take out the rest of the fight in the animal and prevent later kicking problems.

- **After the initial halter breaking, always tie the animal's head up high to teach it to stand with its head up and its feet properly under it.**

Working with your calf each day will help to make it gentle. Having several people feel the animal over its back and ribs will accustom it to handling when at the show. An animal that a show judge cannot handle is at a definite disadvantage.

- **Halter breaking can be successful and fun if you begin when your calf is young and you remember to be patient.**

Nutrition

- **Successful fitting depends on the condition of an animal's skin and haircoat. Nutrition plays an important role in the overall condition of the hair and can be used to promote hair growth. Although every animal has different requirements for its age and show schedule, the following are always necessary:**

Adequate vitamin A, either supplemented or in the feed.

Routine worming.

Proper energy level for development stage and weather conditions. (High-energy feeds and hot weather do not promote long hair growth.)

A balanced ration with minerals and amino acids, especially cystine and methionine.

- **Feeding supplements high in fat and protein such as Calf Manna, linseed meal, or milk replacer promote hair growth and add gloss to the skin and hair.**

- **Don't overlook nutrition if there are problems with hair growth.**

Care of the Hair Coat

- **A good hair coat is important to successful fitting. Many cattle are shown slick in the summer months, but hair care is important year-round.**

- **The first step to a healthy hair coat is external parasite control. It is very important to spray or dip for lice and grubs. Be sure to find out what months are best to use the insecticides in your specific area. Improper use of any chemicals can result in temporary or permanent injury to the animal.**

Watch carefully for ringworm. It is a stubborn problem of young animals. It starts as a round, scaly spot that shows hair loss, and spreads rapidly on the body, to other cattle, and to people. Tips for treatment:

Apply TBZ worming paste daily for five to seven days to a scratched open area and rub in thoroughly; or

Make a thick paste of a 50 percent Captan solution found in an Ortho product called Orthocide, and apply like the worming paste; or

Apply iodine like the worming paste; or

Give fulvicin pills, one each day for three to five days.

After the ringworm is inactive, apply lard to bring the hair back.

Ringworm is mainly unsightly, but many shows don't allow animals with active ringworm.

- **You can keep your animal's hair coat healthy by paying careful attention to its skin and hair.**

Washing the Hair

- Use a mild soap such as Orvis. Rinse thoroughly after each washing.
- Wash with soap only when it is really necessary. Undue use of soap creates dry skin and hair.

Wash prior to the first clipping at home.

Wash upon arrival at the show and after completing the show.

- Washing too often removes the natural hair oil necessary for shine and manageability of the hair coat.

Always use a balsam or oil product to replace the oils after washing. The hair will work better after washing with an oil preparation.

A rose oil mix does a good job. For best results, use this mix after the hair is partly dry.

Make concentrate with:

- 30% rose oil
- 20% balsam
- 10% purple oil
- 30% bay rum
- 10% alcohol

Dilute the concentrate in a one-quart sprayer with 10 parts water to 1 part concentrate.

- You can reduce dandruff by dipping with a vinegar-water dip, which helps remove soap residues. Dipping or scrubbing rough dandruff areas with prepodyne solution also reduces dandruff.

Hair Growing Aids

- Calf hair is good only until it begins to thin and dry, and then it should be removed to promote a new, fresh hair coat.

Body clipping 90 to 120 days prior to the show or show season in most areas promotes fresh hair growth. (See figure 15 at right.)

With regular beef head clippers (84AU blades), clip down on the animal; with plucking blades, clip up.

Leave some hair below the shoulder joint for blending the shoulder into the neck. You can also leave hair between the forearm and shoulder joint to allow a smooth transition between the shoulder and the front leg. Usually, the forearm is shaved to the knee and then blended in around the knee,

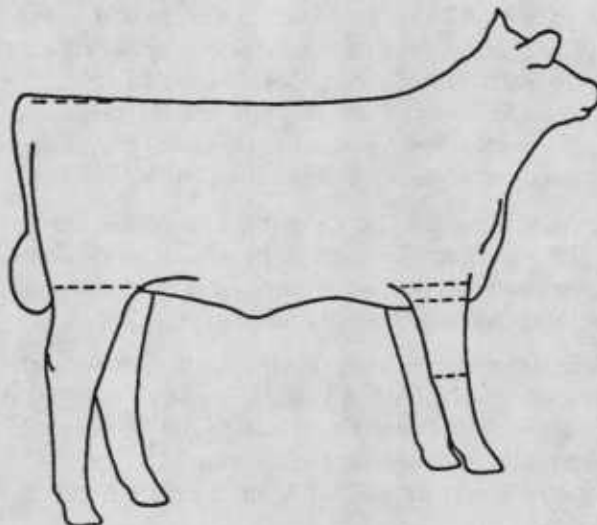


Figure 15. Slick and quartered fitting.

Beef animals sometimes can look better slick and quartered. If an animal's hair is not of the best quality over the entire body, it is probably better to show it this way. Also, if an animal is not long-bodied or trim enough, you might consider this type of clipping method. Breeding cattle often are presented in this manner in the summer months.

giving the front end of the animal a more angular look.

Leave hair on the poll, tail head, and hind legs. Sometimes the hair on the lower quarter is left, too, because this hair is slow to return and is necessary when fitting steers.

Bedding the animal in a dark place during the day shortens the day length, which encourages the animal's hair-growing metabolism.

Good circulation and air movement is very important. A fan or humidifier and a mist system helps to promote new hair, particularly in the warmer months. You can cool the circulating air considerably by placing a fogger that sprays up to one gallon per minute near a fan.

Daily rinsing is a must.

Always (in the summer months especially) rinse the animal's body until it is cool to the touch. Pay particular attention to the belly and neck areas. Rinse twice daily when it is hot.

In the summer months, you can help hair growth by rinsing the hair late in the evening and turning it out wet.

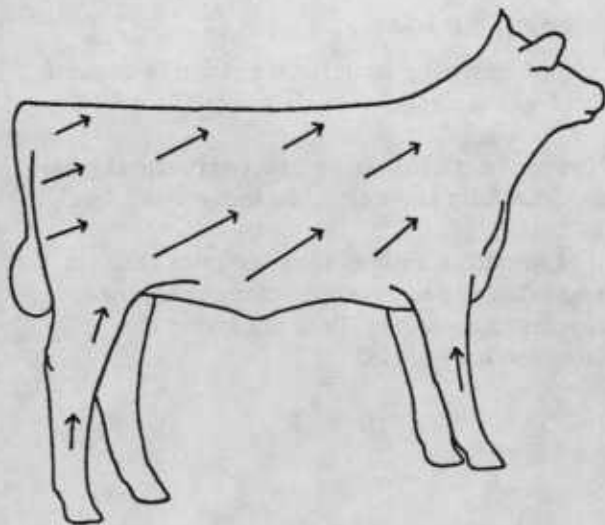


Figure 16. Brushing and combing pattern.

- A. Begin by brushing hair straight forward.
- B. With more hair, brush at a 45 degree angle and gradually work toward desired angle.
- C. Use of a blower (from top to bottom and front to back) helps to train the hair the last 20 days. The tip of the nozzle should rest next to the skin and be moved slowly in an arc pattern for best results.

Use a conditioning product on the hair each time you rinse.

Brush, brush, brush.

Brushing stimulates hair growth, aids in the production of natural oils, and helps to even out rough condition (fat deposit) on market steers.

In the early growth period, use a multi-tooth rubber brush.

In the late hair-growing period, a rice root brush works best. It removes curl and adds bloom to the hair. Always brush on clean, damp, conditioned hair.

Brush or pull the new and growing hair straight forward all over the body after each rinsing. (See figure 16 above.)

Leg hair growth is very important in enhancing a straight-lined look.

Keep the pen clean and free of flies.

Brush clean legs to promote hair growth.

Apply animal fat (lard) daily for 30 days or so to help leg hair growth.

Training Hair to Stand Up

- Apply rose oil mix daily.
- Other products that work are Slick Black, Sweet Georgia Brown or a Peach product.

Use lightly every other day for 30 days. This gives the hair weight and manageability.

Hair training sprays are very drying.

Astringent sprays also are drying, but can aid in clipping because they make the undercoat stand out straight.

You also can use Bay rum or Absorbine liniment.

- Because progress is slow in this area it's hard to stay motivated, but it is the most important part of fitting.

Clipping Essentials

- Clipping is perhaps the most rewarding part of the fitting process. It's a great feeling to see the changes you can make in an animal by applying some specific fitting techniques. You'll need lots of patience and practice. (Refer to figures 18, 19, and 20 on pages 34, 35, and 36, respectively.)

- Not all animals are clipped alike. The key to a successful clip job is to know your animal's faults and weaknesses. Clipping allows you as the artist to sculpt the ideal animal. Here is where you get to apply your knowledge of the ideal market animal!

- Clean, conditioned hair is a must.

- Clippers need to be in good order. You will need:

A regular pair of Sunbeam clippers. Use standard, flat 84AU blades, or the plucking blade for shaving areas where you wish to leave more hair.

A pair of Shearmasters. Use the C-type head with the 20-tooth goat comb blade (P7112 blade).

A pair of inexpensive, small animal adjustable clippers (handy for fine fitting jobs).

Clipper oil and hair oil mix.

- The animal should be restrained for its safety and yours. A blocking chute is best (see figure 21, page 37, and figure 22, page 38).

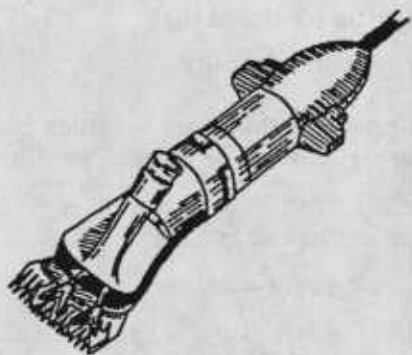


Figure 17. Shearmasters.

Clipping the Body

- This is where the actual sculpting comes in. If you are a beginner, use two hands—one to steady the clippers and one to hold them. Use the animal's body as a guide for your guiding hand.
- The hair is usually trimmed in an upward and forward motion. (See figures 23 and 24, page 39.)
- Work one area at a time (shoulder, top line, etc.).

Get a picture in your mind of the effect you wish to achieve.

Evaluate the animal carefully and trim off the hair accordingly.

If you want the animal to exhibit a muscular appearance, make the shapes full and the corners rounded.

If you want the animal to appear flat and angular, make the shapes flatter and more angular.

Mistakes and gaps will happen and serve as a good learning tool. You can learn only by doing the actual clipping yourself.

- **There are distinct differences between clipping breeding cattle and clipping market steers.**

In breeding cattle, important traits are flat, deep-tying muscles and angularity.

When clipping market cattle, try to enhance thickness, muscle definition, eye appeal and condition.

- **Expect to perform at least two clips before reaching perfection.**

Trimming the Feet

- If (but only if) a structural change is desired, trim feet on a regular basis every 30 to 60 days.
- Proper trimming can correct structural problems and help the animal to move more freely.
- Let someone with experience trim the feet. Inexperience can cause permanent injury or movement disorders. Feet trimming also is discussed on page 30.

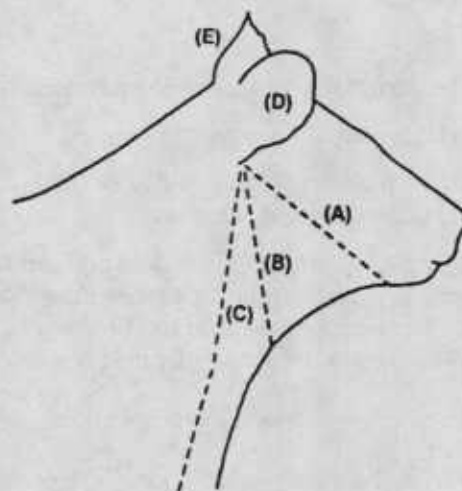


Figure 18. Clipping the head.

Always clip against the natural direction of the hair pattern with the 84AU blades to achieve a close, smooth job. There are several clipping patterns, three of which are illustrated.

A. This clip helps to fill out a narrow head by leaving the cheek hair in place and blending it into the brisket area.

B. Conventional clip.

C. This clip line promotes a longer extension of the neck. The line is blended in carefully and joins the line in the brisket area.

D. Usually the hair is thinned on the ears, promoting a more traditional look to the head.

E. The poll hair is left on and blended into a peak. The poll hair serves to give style, length, and eye appeal to the head.

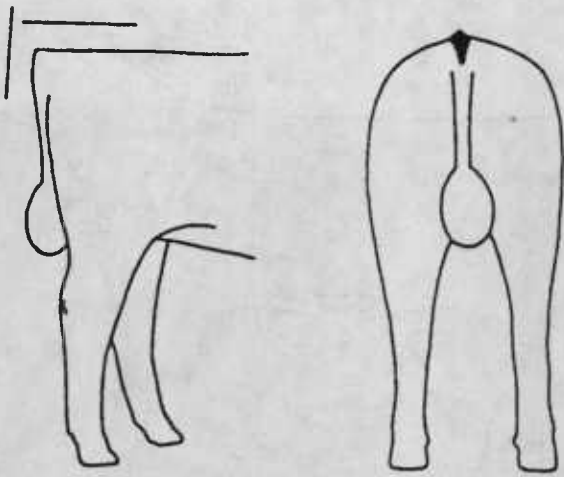


Figure 19. Clipping the tail.

- A. Extend the hair at the tailhead so it has the appearance of a corner.
- B. The hair down the middle of the tail is clipped into a short "V." This gives the appearance of more width between the pins.
- C. A tailhead with a slight upswing on the end will help to level out the hip.
- D. The tailhead hair may be held up with wax or glue and then trimmed to the desired shape.

Exercise

- **Exercise is necessary. It adds muscle tone, increases appetite, and firms over-conditioned animals.**
- **Exercise your animal moderately every day.**

Show Day Preparation

- **This is the day that all your hard work, long hours, and patience pay off.**
- **Allow about 45 minutes per animal. Rinse and blow dry prior to this time, or use an alcohol or astringent spray rinse.**
- **Work the hair.**

Apply an oil mix and brush it in.

Apply show foam over the entire body (except the legs). Brush it in and blow it very dry. The foam holds the hair and brings up the under coat.

If necessary, apply any other soft hair products (Slick Black, etc.) on hard-to-hold areas. Apply any sticky substances such as hair spray or glue toward the end of the preparation period.

- **Put up the tail. (See figure 25, page 40.)**

- **Leg preparation. Boning and clipping the legs enhances the animal's straightness and eye appeal.**

To hold leg hair in place for clipping, use spray glue, wax, or Amway glycerine.

Apply the soap or wax evenly in a downward motion on the leg. Then pull the hair and forward, one area at a time, with a scotch comb. Don't bone the legs too high on the hindquarter. The leg and hindquarter must join as smoothly as possible.

If the wax is too hard to go on smoothly, heat slightly under a heat lamp or in hot water. If the wax or soap dries too quickly on the leg, dip the scotch comb in hot water and it will pull through the hair more easily.

Clip legs again for final effect. (Again, refer to figures 23 and 24, page 39.)

Paint the legs. Use a non-oil base paint (such as Streaks N' Tips) after boning and clipping the legs.

Paint the feet.

- **You, the 4-H member**

Your own appearance in the ring makes an impression on the judge. Above all, you should be neat and clean. This means that your clothes should be clean and neatly pressed and your hair neatly trimmed and combed.

When showing, girls should wear a blouse or sweater in combination with pants. Skirts and shorts are not appropriate. For boys, a clean, pressed shirt and long pants are acceptable. Avoid shirts with advertising, corporate logos, and excessively loud colors that detract from the calf. All exhibitors should have footwear that provide adequate protection (hard-soled shoes) in case the calf steps on them.

Be courteous in the ring and considerate of others. Respond readily to requests from the judge. Be calm in the ring and move quietly with your calf. Show the audience that you are proud of your project by treating your calf with respect and care. Be confident without being overly serious; relax and enjoy the opportunity to show the judge what you have learned over the past 6 to 10 months!

Be a modest winner or a gracious loser. Be quick to complement others in the ring who competed with you. Do not criticize or complain when you do not win. Those who do not win all the time should learn from those who do. Parents, 4-H leaders and fellow members will remember the actions of a poor loser after they have forgotten the actions of a gracious winner.

• Final Preparation

Apply any glue or hair spray on hard-to-hold areas on the body and a final oil shine, if needed. If the glue is sprayed in the wrong area, lanolin (spray) will remove it without creating an oily spot.

Put the show halter on the animal and adjust it up near the eyes.

Check the animal's fill (stomach). A proper fill is important.

Some long hay and/or water will help to fill an animal.

Fill gives the animal the appearance of having volume.

If time allows, take the animal out of the chute and walk it around. Check for any last minute touches.

• Ways to remove hair products after the show.

Make sure all hair products are thoroughly washed out with soap to prevent skin irritation. The following make this project easier:

Outcast or E-Z Out

Cream-type hand cleaner

Shout laundry cleaner

Alcohol and purple oil, mixed

Mineral oil

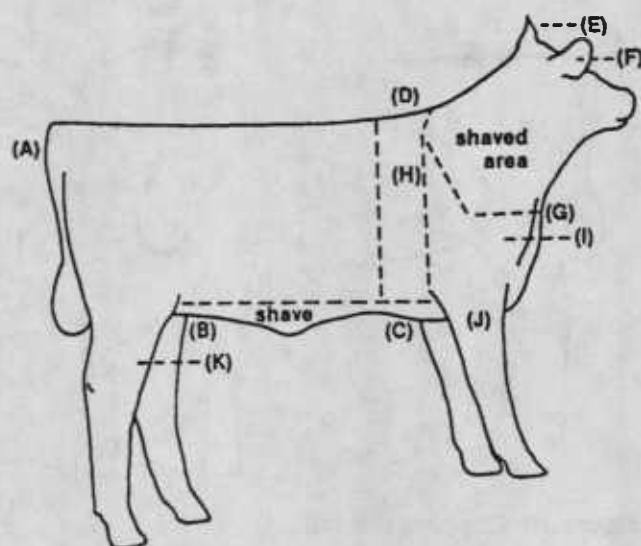


Figure 20. Guidelines for clipping close areas.

A. Tail and tailhead—The tailhead area is used to enhance the visual effect of a level hip. It can add body length or thickness by the way it is clipped.

B. Rear flank—Use this as a guide for beginning the bellyline. This line can be used to create an illusion of more volume or less volume. By lowering the line from the standard clip and leaving long hair from the navel area back a look of greater volume is achieved.

C. Point of elbow—Use this as a guide for ending the bellyline.

D. Top of shoulder joining neck—Hair should be utilized in this area to give the appearance of a smooth joining of these two parts.

E. Poll—Leave this hair on the head to give added head length and youthfulness.

F. Ear—Leave most of the hair on the ear; thinning is acceptable.

G. Point of shoulder—Use this as a guide point when shaving the front end. Hair should be trimmed very short in this area to reduce prominence.

H. Behind the shoulder—The hair is left in this area as long as possible to ensure proper blending of the shoulder joint.

I. Under the shoulder point—This hair and some neck hair is left long and used to blend in a prominent shoulder.

J. Front leg—Usually shave to the knee in breeding cattle to show angularity.

K. Front of rear legs—Shave this area to help give the appearance of a straighter hind leg.

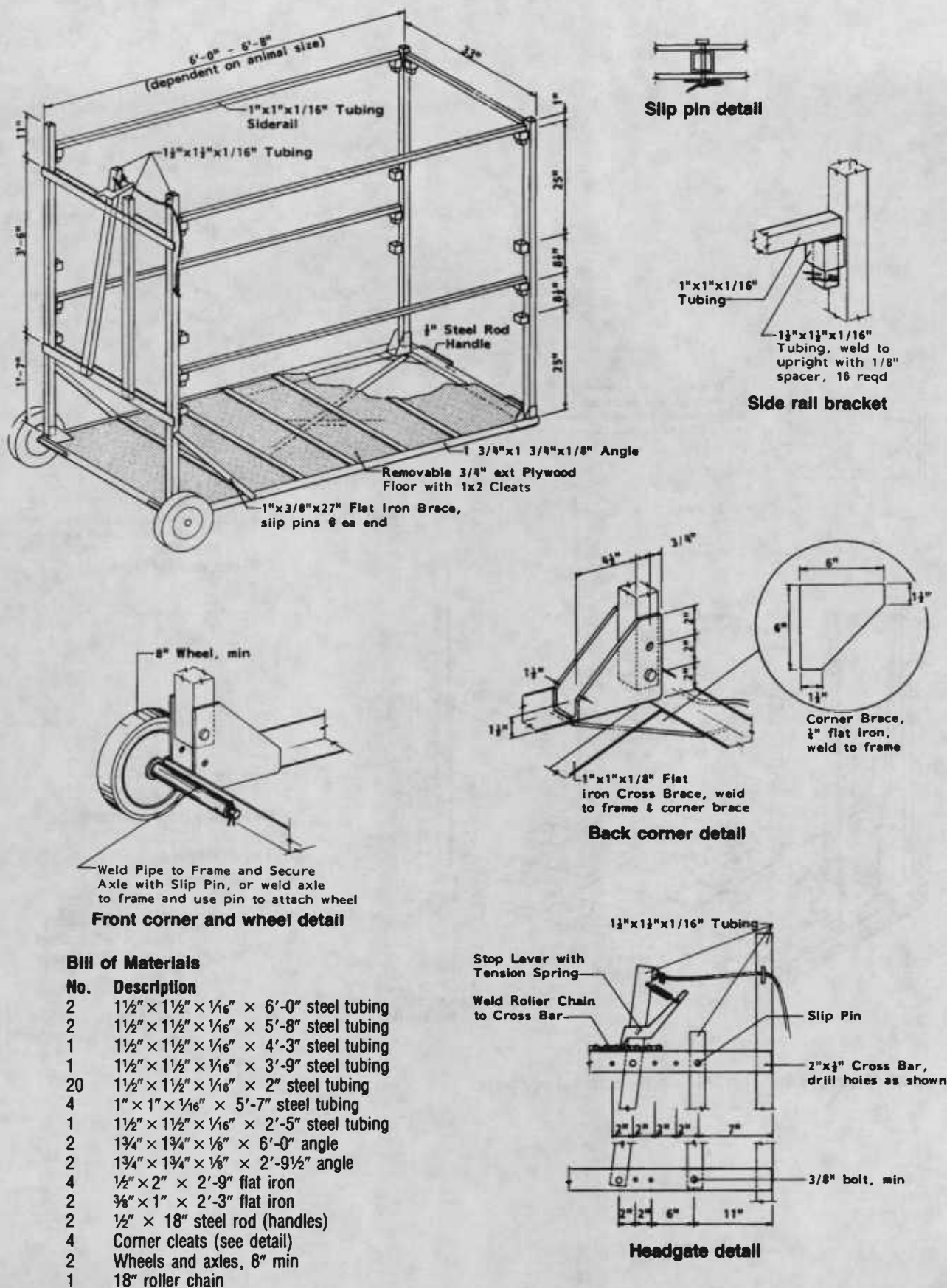


Figure 21. Lightweight portable cattle trimming chute.

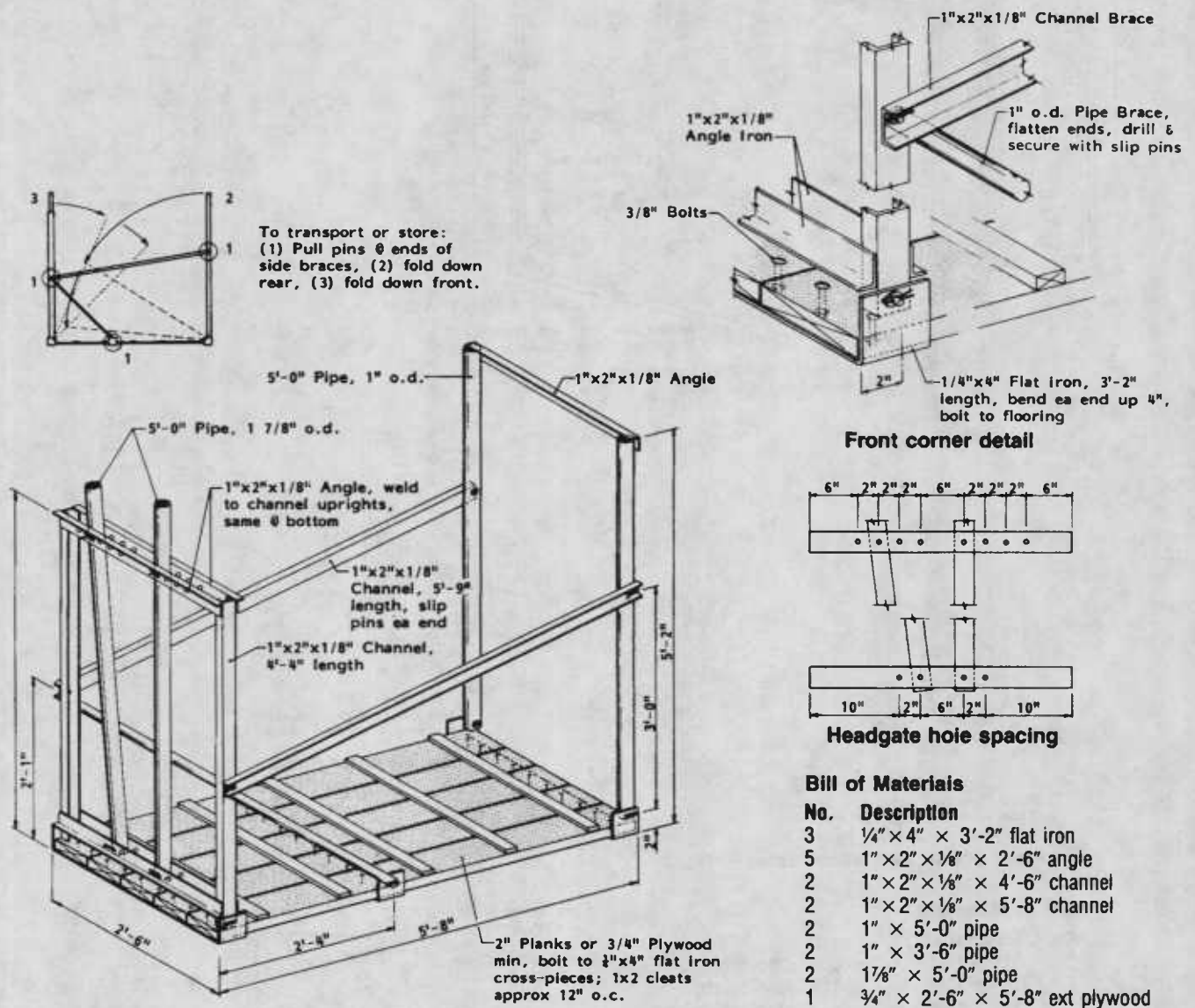


Figure 22. Heavy-duty portable cattle trimming chute.

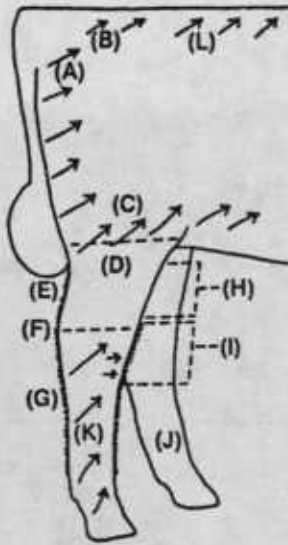


Figure 23. Clipping the hindquarter and blocking the hind leg.

A. Hair in this area should be brushed around the hindquarter to add dimension when viewing the animal from the rear.

B. Hair in this area is used to fill in the hip to make it appear to be more level from hooks to pins.

C. Hair is pulled up and out and held in place to add muscularity.

D. This area is trimmed very short on steers but hair is left longer on breeding cattle.

E. Hair is always left in this area above the hock to reduce hock prominence.

F. The ball of the hock is shaved to the skin in about a three-inch long area to reduce hock prominence.

G. The long hairs only are trimmed after boning the leg (pulling the hair up) to give the appearance of a straighter leg.

H. Shave or trim this area close to the skin beginning right above the hock area to straighten the leg (very important).

I. Leave all of the long hair here to fill in the hock joint area and to straighten the leg (very important).

J. Trim this area and around the entire leg to give a straight symmetrical appearance.

K. The hair on the inside and outside of the cannon bone is pulled slightly forward to help add hair length to the front of the leg.

L. The loin area in steers should be clipped flat on top and all of the hair left on the loin edge. On heifers this area is clipped in an angular fashion, with the most hair remaining down the top line from the tail to the shoulder.

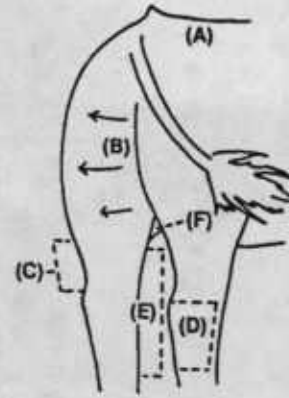


Figure 24. Clipping the hindquarter (rear view).

The rear view of an animal is perhaps the most important view when evaluating cattle. It shows muscularity, muscle design, cleanness, condition, height, and structural correctness in the animal. This diagram indicates the proper clipping methods on the hindquarter and hind leg as viewed from the rear.

A. The hip hair is very important to give the animal a level hip. It is left long and blended into the hip and hindquarter.

B. This area close to the tail is trimmed very short in an outward motion, leaving the most hair on the hindquarter edge. This adds thickness and dimension.

C. This area is trimmed very short on steers to add muscle shape and is left longer to give a flat appearance on breeding cattle. Blend from the hock into the lower stifle.

D. The outside hock area is trimmed very short. This adds to the straightness of the leg and gives the animal the appearance of being taller.

E. The inside hock area and twist can be shaved or trimmed very short to add height to the animal.

F. The twist area can be shaved if a flatter muscle design is desired or the hair can be shaped to give the appearance of more muscle.

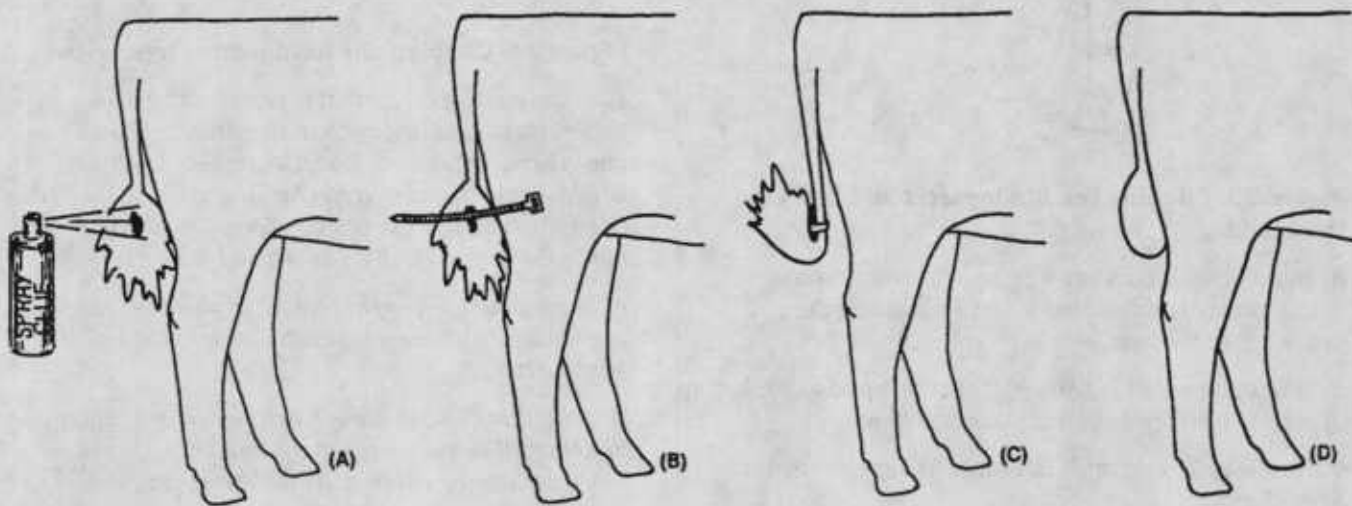


Figure 25. Putting up a tail.

A. Comb out the tail. Then rat a small part of the hair near the base of the tail and spray with glue.

B. Put a tail tie through the knot of glued hair.

C. Turn the tail up toward you and to the tail shaft itself. Pull the tail tie tight around the tail shaft at the proper height. Trim excess tie.

D. Rat the tail hair completely and form it into a symmetrical ball, using glue as needed. The hair can be pulled to one side or up around the tail bone. Spray the entire switch with glue, Streaks N' Tips (no paint) and bag with a plastic bag.

The completed tail should be in a position to add balance to the animal. A tail too high will make the animal look heavy-fronted.

Equipment Supply List

You should obtain certain equipment early in your program so that you and your calf will become used to it. Below is a complete listing of equipment you might need. You won't need every item. Sometimes, you may borrow or purchase items from other members of your club. However, it is best if you have these items to use as you become more confident in working with your calf.

Grooming Supplies

Rice root brush
Soft brush
Multi-toothed brush
Scotch comb
Tail comb
Sprayer
Hoof brush
Blower
Rose oil mix
Boning soap or wax
Tail glue
Body adhesive
Leg adhesive
Slick Black, etc.
Final mist
Tail ties
Paint

Streaks N' Tips
Show foam
Hair spray
Black Glow
Scissors
Lanolin spray
E-Z Out, etc.
Towels

Washing Supplies

Soap
Vinegar dip
Balsam
Scrub brush
Hose and nozzle
Extra nylon halter

Show Ring Supplies

Show halter
Clean scotch comb
Show stick
Nose lead (for bulls)

Other Supplies

Feed pans
Buckets
Extension cords
Clippers
Electric clipper blades
Baggies for tail
Broom, fork, pliers, etc.
Muzzle (if needed)
Neck ropes
Blocking chute
4-way electrical outlet
Stall signs
Health/registration papers
Show box
Lock (key or combination)

A show box is a convenient way to store and transport your valuable show equipment and to keep it safe and secure while at the show or during the "off" season at home. Show boxes commonly are about 3 feet long, 2 feet wide and 1 1/2 feet deep.

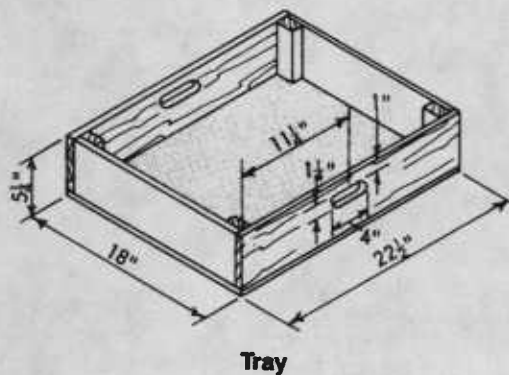
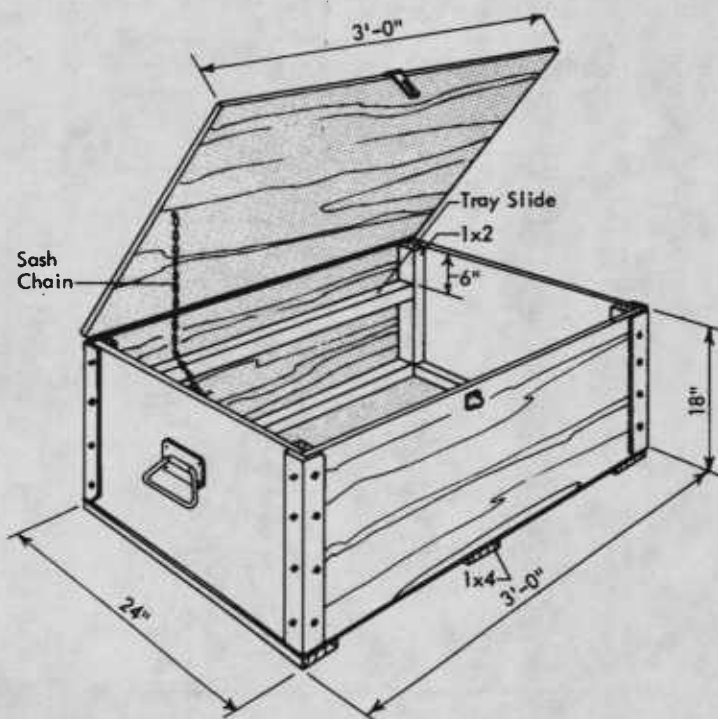


Figure 26. Show box.

Beef—a Food Product

To a great extent, the beef industry was built on the taste appeal of beef. In earlier years, people enjoyed the taste of beef and knew the importance of it as a protein source. Before we can identify the role beef plays in a well-balanced diet, it is important to understand how beef consumption has changed over the past 20 years.

According to the USDA, in 1985 the total food supply of red meat, poultry, and fish consumed by each person in the United States was 185 pounds—a 15 percent increase over 1965 figures. The largest increase has been for poultry; between 1965 and 1985, chicken consumption increased 72 percent and turkey 62 percent. During the same period, the per capita (per person) consumption of red meat (beef, pork, lamb, and veal) increased only 0.7 percent. In fact, red meat consumption decreased more than 10 percent from its highest level of 135.5 pounds in 1971 to 121.4 pounds in 1985. Beef accounts for more than 60 percent of the red meat category, and in 1985 beef consumption was up 7 percent over 1965, with beef consumption peaking in 1976 at 89 pounds per person. The chart below helps to point out the pounds per capita consumption of red meat, poultry and fish and egg consumption since 1970.

Now that you have some idea of how much meat is consumed by citizens, it is important to understand the different reasons people have for purchasing meat. With this knowledge, we may be able to understand why poultry consumption has increased so dramatically while beef and other red meat consumption has increased only slightly.

The needs of today's consumer are changing and no single description can encompass the variety of consumers in the marketplace. The beef industry has identified five categories of consumers, each of which has a level of beef consumption and different reasons for selecting beef as a part of their diet.

The five categories are: health oriented; active lifestyle; price driven; creative cooks; and meat lovers.

The health oriented group makes up approximately 27.3 percent of the population. This group believes in limiting fat intake and avoiding cholesterol. Generally, this group has a negative attitude toward meat.

Active lifestyle consumers account for 22.2 percent of the population. The concern for this group is not the price of meat but the limited time available for meal preparation. Their negative attitude toward

Table 4. Pounds per Capita Consumption of Red Meats, Poultry, Fish, Eggs, Beans, and Nut Products

Item	Annual average					
	1970-74	1975-79	1980-84	1985-89	1989	1990*
<i>Pounds per capita</i>						
Red meat, poultry, and fish ^{1,2}	177.2	179.4	181.5	190.0	192.6	191.3
Red meats ^{2,3}	130.4	128.6	123.8	120.0	115.9	112.3
Beef	79.1	82.8	73.1	70.5	65.4	64.0
Veal	1.7	2.3	1.4	1.3	1.0	.9
Pork	47.7	42.4	48.3	47.1	48.4	46.3
Lamb and mutton	1.9	1.1	1.1	1.0	1.1	1.1
Poultry ^{2,3}	34.7	38.0	44.9	54.9	60.8	63.6
Chicken	27.9	30.7	36.3	43.2	47.3	49.3
Turkey	6.8	7.2	8.6	11.7	13.5	14.4
Fish and shellfish ²	12.1	12.8	12.9	15.4	15.6	15.4
Fresh and frozen	6.9	7.8	8.1	10.0	10.2	10.1
Canned	4.6	4.5	4.5	5.1	5.1	5.1
Cured	.5	.4	3	3	3	3
Eggs ^{3,4}	37.9	34.5	33.5	31.6	29.9	29.6
Peanuts (shelled basis)	5.7	5.8	5.7	6.6	7.0	6.3
Tree nuts (shelled basis)	1.8	1.8	2.1	2.3	2.4	NA
Dry edible beans and peas	7.0	6.7	6.3	6.7	NA	NA

*Preliminary. NA = Not Available. ¹Boneless, trimmed weight. ²May not total due to rounding.

³Excludes shipments to Puerto Rico and the Virgin Islands. ⁴A dozen eggs converted at 1.57 pounds.

meat comes from the belief that it takes too much time to prepare a "home-cooked meal."

Another 22.2 percent of the consumer population comprises the price driven segment. The price of food is the primary concern that determines whether meat is in their meals. They have a positive attitude toward meat, but usually choose a cheaper alternative.

The creative cook segment represents about 21.2 percent of the consuming public. This group enjoys preparing creative meals from exotic recipes that are both appetizing and healthy.

Finally, 7.1 percent of the population comprise the meat lovers. This group believes that meat is a must in a meal because of its appealing taste and healthfulness.

Another area to consider before we look into the nutritional value of beef is the recommended consumption for a healthy, well-balanced diet. In 1992, The U.S. Department of Agriculture (USDA) revised their guidelines on foods needed for good health. To

assist consumers in understanding the importance of the different food groups, the USDA designed the "Food Guide Pyramid" to help illustrate the proportion and types of foods that should be included in a healthy diet.

As illustrated below, the Food Guide Pyramid suggests two to three servings of meats and meat alternatives (dry beans, eggs and nuts) per day. This is equivalent to 5 to 7 ounces of cooked lean meat, poultry, or fish per day.

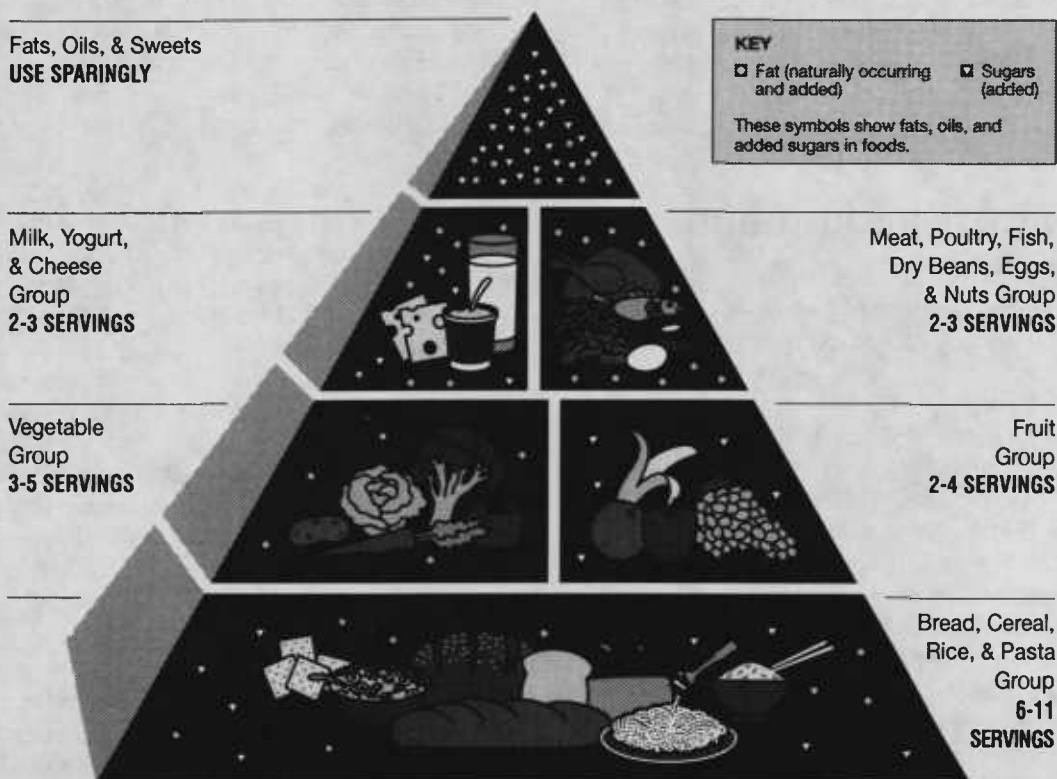
What counts as a serving?

- Count 2 to 3 ounces of cooked lean meat, poultry, or fish as a serving. A 3-ounce piece of meat is about the size of an average hamburger, or the amount of meat on a medium chicken breast half.
- For other foods in this group, count 1/2 cup of cooked dry beans, 1 egg, or 2 tablespoons of peanut butter as 1 ounce of meat (about 1/3 serving).

Because portion sizes vary with the type of food and meal, it's rather tricky determining whether you are

Food Guide Pyramid

A Guide to Daily Food Choices



getting your 5 to 7 ounces of cooked lean meat per day. As an example, you could fall within the USDA's Food Guide Pyramid if, during an average day, you consumed:

- 1 egg (count as 1 ounce of lean meat) for breakfast;
- 2 ounces of sliced turkey in a sandwich at lunch; and
- 3 ounces cooked lean hamburger for dinner.

Selection Tips for Preparing Your Meat Dish

- Choose lean meat, poultry without skin, fish, and dry beans and peas often. They are the choices lowest in fat.
- Prepare meats in lowfat ways:
 - Trim away all the fat you can see.
 - Broil, roast, or boil these foods instead of frying them.

So why should we include beef in our diets? There are several good reasons. Beef is a nutrient-dense food, especially rich in protein, the B vitamins, iron, and zinc. The fat content of fresh, cooked beef differs by cut and grade and, to a lesser degree, by method of preparation, since most fresh beef is cooked by broiling and roasting or braising. A change to leaner meat, as recommended by the USDA Food Pyramid, multiplies the beneficial effects on the total diet, which includes a higher concentration of the B vitamins, iron, phosphorus and zinc.

Beef Carcass Information

To determine carcass value, live market cattle evaluations estimate important carcass characteristics such as fat, muscling (cutability or yield grade), and quality grade.

Quality grades are intended to relate market desirability to cooked palatability and thus, consumer acceptance. There are eight USDA quality grades: Prime, Choice, Select, Standard, Commercial, Utility, Cutter, and Canner. Quality grading of beef carcasses is determined by subjectively scoring maturity or physiological age of the carcass and marbling or the amount of visible flecks of fat within the lean of the ribeye muscle. Marbling is an indicator of eating quality. It is associated with the length of time the animal has been on a high-concentrate finishing diet. Animals also have genetic contributions that help determine their ability to lay down marbling.

The amount of marbling in the ribeye is divided into nine degrees (lowest to highest):

Degree of Marbling	Quality Grade
Practically devoid	Low standard
Traces	High standard
Slight	Select
Small	Low choice
Modest	Average choice
Moderate	High choice
Slightly abundant	Low prime
Moderately abundant	Average prime
Abundant	High prime

This table represents the degrees of marbling associated with various quality grades. Other factors, such as maturity, also play a role in determining quality grade.

USDA meat graders evaluate each carcass for eating quality while in the meat cooler at the packing plant. The quality grade insignia is stamped on the carcass so that the grade can be seen on the outside of each wholesale cut. Each grade represents a different quality of meat and is a reliable guide to tenderness, juiciness, and flavor.

There are five levels of maturity, designated as A, B, C, D, and E. Maturity A and B are the young cattle designations eligible for the grades of Prime, Choice, Select, and Standard. Maturity levels C, D, and E are eligible only for the grades Commercial, Utility Cutter, and Canner. Nearly all 4-H steers are in the "A" Maturity classification (less than 30 months of age) at the time of slaughter.

A desirable goal for a 4-H market beef project is for the carcass to have .3 to .4 inches of fat covering, at least a small degree of marbling, and a low choice quality grade. Due to genetic differences, not all cattle with .3 to .4 fat thickness will make the choice quality grade. However, the high select grade offers a lean, nutritious product that is very desirable to the health-conscious consumer. Avoid producing standard quality carcasses, since their eating quality is inferior. Commercial, utility, canner, and cutter quality grades typically are mature cows (C, D, and E maturity)—grades not associated with the 4-H market beef project.

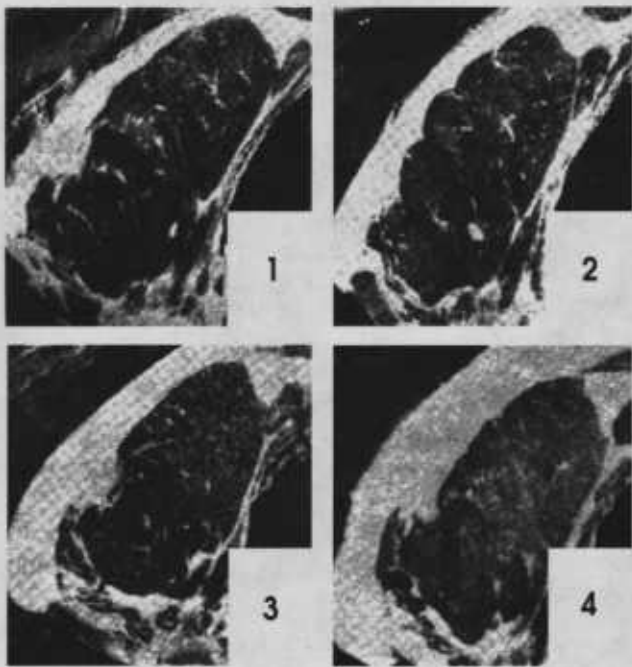
Yield Grade (YG)

In 1965, the USDA adopted a grading system for estimating cutability. Cutability is defined as the percentage of carcass weight in boneless, closely trimmed retail cuts from the round, loin, rib, and

chuck. Cutability is based on four carcass measurements:

1. Fat thickness
2. Ribeye muscle area
3. Percent internal fat
4. Hot carcass weight

For industry purposes, the USDA developed a system of numerical grades called yield grades, which merely reflect cutability values. The grades are designated 1, 2, 3, 4, and 5. Each yield grade corresponds to an expected cutability value, with a yield grade 1 carcass yielding 52.3 percent or more of trimmed, retail cuts, and a grade 5 yielding 45.4 percent or less of the same cuts. The illustration shows yield grades 1 through 4. Note the square inches 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.



By keeping records of performance, including growth rate and carcass merit, cattle producers are able to select superior cattle and to cull inferior cattle. As a part of your 4-H Market Beef Project, you can do the same thing as commercial cattle producers. Your county Extension agent can help you obtain carcass information on your own cattle.

Marketing Your Cattle

When steers are shown at a county fair or larger show, it is customary for them to be sold through an auction following the show. In order for a steer to be sold in an auction he must be weighed and identified. It is up to each seller of an animal to become familiar with requirements for sale. When in the sale arena with your animal, be sure you display the animal so that it will look its best. After the auction, give whatever assistance is needed in caring for the animal you have just sold.

Get the name and address of the buyer so you can thank him or her properly with a written letter. If your animal does not bring as much money as you hoped for, be thankful that someone did buy the animal. Expressing your appreciation to the buyer in person, prior to sending a written letter, is often the best approach.

Breeding animals such as heifers usually are sold by private treaty. When selling by private treaty, make sure you know approximately what your animals are worth from sales of comparable animals, and set the price accordingly.

When selling registered breeding stock, you are responsible for transferring registration papers to the new owner. Make this transaction as rapidly as possible. Make sure that the buyer's name and address are correct. Have the buyer write down how the new ownership should appear on the registration paper.

Practice strict honesty in all business dealings. Remember, whoever buys your product is buying partly because of faith in you.

Consumer Education

Another activity in the beef cattle project is consumer education. This phase of the 4-H beef project is for members who do not have a beef animal but are interested in the food science part of the beef industry. It also is the final phase for those who have beef animals.

Beef, as a red meat, still has a strong following among consumers. Consumers should be as well informed as possible when purchasing and preparing beef for eating. They should know what part of the carcass retail cuts come from, which cuts to buy for a particular purpose, which cuts are lean, how to figure price per serving, and the best method of cooking various retail cuts. Consumers also should

be aware of approximately how much retail beef is actually produced by a choice steer. For example, assume a steer has a live weight of 1,150 pounds. After the head, hide, feet, and internal organs are removed 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 twelfth and thirteenth ribs.

Some retail stores still buy beef by a side or a quarter at a time, but the trend is toward having the quarters 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. Consumers need to be aware of constant improvements being made in the beef industry. They should also know that it takes two years or longer from the time a cow is bred until the resulting calf is a finished beef ready for eating.

The Beef Chart on page 47 shows retail cuts and their location in the carcass.

As part of your training in this phase of the 4-H project, familiarize yourself with identification of chuck roast, arm pot roast, rib roasts, and steaks. All of these cuts are from the front, or forequarter.

You also should be able to identify club, T-bone, porterhouse steaks, sirloin steaks, rump and sirloin tip roasts, and round steaks and roasts. These come from the hindquarter.

Shopping at the Retail Counter

To be an intelligent purchaser of beef cuts, you should be able to identify cuts as seen in the retail counter, and you should know approximately how much of each cut is considered a normal serving.

The cut of meat at the lowest price per pound is not always the best buy. Consider the cut, the amount necessary for a family meal, and the cost per serving of different retail cuts of beef.

Barbecuing Beef

Barbecuing, or broiling over an open grill, is one of life's enjoyable activities. Many meat cuts can be cooked economically out-of-doors at a family or group barbecue. Beef burgers are one of the easiest and most popular items prepared by this method. Steaks for barbecuing should be cut about 1-inch thick, and include rib, club, T-bone, porterhouse, sirloin, and filet mignon or tenderloin cuts.

Many cuts of beef can be cubed and used on a skewer with green peppers, tomatoes, onions, pineapple, or whatever you desire. Use your imagination to come up with a new delicacy of your own. During the past several years, the beef industry has developed many new ways to prepare beef. Check with your state Beef Council or Cattle Producer's Association, or write the Beef Industry Council (see association address in back of manual).






























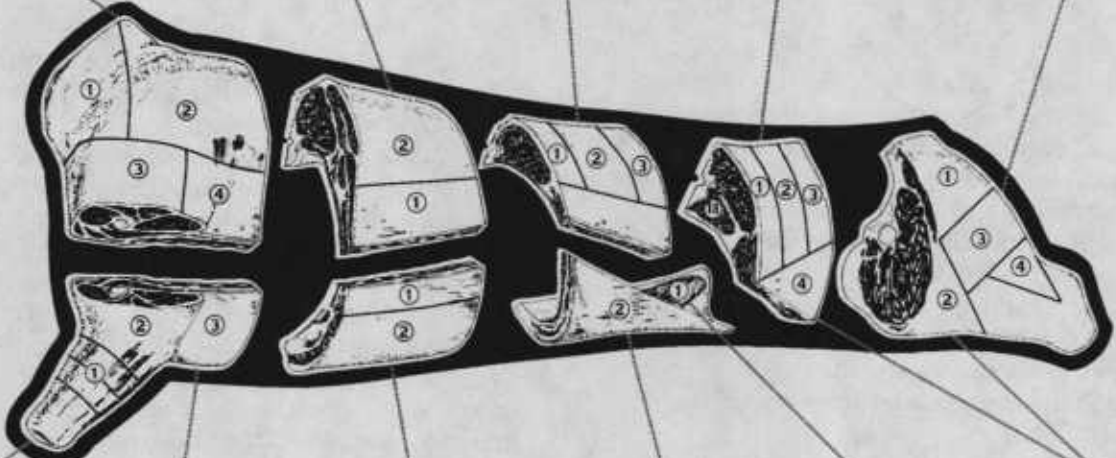















Table 5. Compare Cost per Serving for Beef

Meat and cut	Retail price per pound	Servings per pound	Cost per serving
Steaks			
Cubed	_____	4	_____
Flank	_____	4	_____
Rib	_____	2	_____
Round	_____	3 1/2	_____
Sirloin	_____	2 1/2	_____
Roasts			
Chuck	_____	2	_____
Chuck, boneless	_____	3	_____
Rib	_____	2	_____
Rib, boneless	_____	2 1/2	_____
Rump, boneless	_____	3	_____
Sirloin	_____	3	_____
Dried, chipped	_____	8	_____
Frankfurters	_____	4	_____
Ground beef	_____	4	_____
Ground chuck	_____	4	_____
Heart	_____	5	_____
Kidney	_____	5	_____
Liver	_____	5	_____
Short ribs	_____	2	_____
Stew, boneless	_____	5	_____
Tongue	_____	3	_____

Source: OSU Extension home economics program.

BEEF CHART

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

 ② Boneless Chuck Roll  ③④ Chuck Short Ribs  ② Blade Pot-roast or Steak  ③ Arm Pot-roast or Steak  ③ Boneless Shoulder Pot-roast or Steak  ④ Boston Cut  ① Beef for Stew  ① Ground Beef**	 ② Standing Rib Roast  ② Rib Steak  ② Rib Steak, Boneless  ② Rib Eye (Delmonico) Roast or Steak	 ① Club Steak  ② T-Bone Steak  ③ Porterhouse Steak  ①②③ Top Loin Steak  ②③ Tenderloin (Filet Mignon) Steak or Roast (also from Sirloin 18)	 ① Pin Bone Sirloin Steak  ② Flat Bone Sirloin Steak  ③ Wedge Bone Sirloin Steak  ①②③ Boneless Sirloin Steak	 ③ Round Steak  ④ Heel of Round  ③ Top Round Steak*  ① Rolled Rump*  ③ Bottom Round Steak or Pot-roast  ③ Cube Steak*  ③ Eye of Round*  ③ Ground Beef**
CHUCK Braise, Cook in Liquid	RIB Roast, Broil, Panbroil, Panfry	SHORT LOIN Roast, Broil, Panbroil, Panfry	SIRLOIN Roast, Broil, Panbroil, Panfry	ROUND Braise, Cook in Liquid
				
FORE SHANK Braise, Cook in Liquid  ① Shank Cross Cuts  ② Beef for Stew (also from other cuts)	BRISKET Braise, Cook in Liquid  ③ Fresh Brisket  ③ Corned Brisket	SHORT PLATE Braise, Cook in Liquid  ① Short Ribs  ①② Skirt Steak Fillets*  ①② Beef for Stew (also from other cuts)  ①② Ground Beef**	FLANK Braise, Cook in Liquid  ① Ground Beef**  ① Flank Steak*  ① Beef Patties  ① Flank Steak Fillets*	TIP Braise  ④② Tip Steak*  ④② Sirloin Tip*  ④② Sirloin Tip Kabobs*

*May be Roasted, Broiled, Panbroiled or Panfried from high quality beef.
 **May be Roasted, (Baked), Broiled, Panbroiled or Panfried.

This chart approved by
 National Live Stock and Meat Board

National Live Stock and Meat Board

Courtesy of
OREGON BEEF COUNCIL

Career Opportunities in Animal Science and Related Industries

Animal agriculture is facing many challenges, and innovative people are needed to meet those challenges. The USDA reports that 48,000 jobs exist annually for college graduates with expertise in agriculture and related industries. The livestock industry and related fields are a major component of the U.S. economy. Career opportunities are excellent for men and women trained in animal science.

Traditional production and management positions are the cornerstone of the beef cattle industry. However, these positions are becoming more technical and integrated. Industry professionals must be superb business people with knowledge of nutrition, genetics, physiology, animal behaviors, and meats. In addition, they must have a working knowledge of computers and their application to production and management decisions. Marketing expertise also is essential.

The food industry is a major employer of animal science graduates. This segment of the industry is concerned not only with the marketing of meat, but also with the fabrication of new products. New product development includes convenience foods and foods that appeal to a health-conscious consumer. This progressive component of animal agriculture hires animal science graduates as cattle buyers, meat graders, food safety specialists, product development specialists, quality control specialists, production managers, and sales personnel.

The animal feed/health industries are constantly seeking bright, energetic young people to enter research groups, sales forces, and consulting agencies dealing with commercial livestock production. In addition, pre-professional programs of study are available in animal science that prepare students to enter veterinary schools and pursue careers in animal health or associated fields.

Other employers of animal science graduates are communication and service organizations. Breed associations, livestock commodity groups, artificial insemination services, and government agencies hire people to represent their organizations. Likewise, livestock publications, newspapers, television stations, advertising agencies, and public relation firms need talented people who can communicate.

Communication skills are essential in all fields, and animal science students can turn these skills into satisfying careers. Service organizations such as banks, insurance companies, real estate agencies and power companies employ agricultural representatives in positions requiring a background in animal agriculture.

People with advanced degrees in animal science are needed to teach in high schools, community colleges, and universities. Teaching also is an important component of the cooperative Extension Service and includes both youth and adult education.

Research is another segment of animal agriculture that employs students with a strong interest in science. Research designed to improve the efficiency and quality of domestic animals and to solve livestock-related problems is conducted by a number of agencies including the USDA, universities, and private companies. Individuals with bachelors, masters, and doctorate degrees in animal science have an opportunity for rewarding careers in research.

The highly interactive disciplines of chemistry, biochemistry, molecular biology, and microbiology are integrated into many research activities as they relate to research in animal and food science. Biochemical techniques have been applied to isolate and characterize fatty acids and proteins. Through molecular and microbiological approaches, it is possible to study regulation and structure genes. In physiology, there are continuing efforts to understand the growth of muscle, fat and bone. Reproductive physiology is studying the functions of several organs and their relationship with a number of important hormones. Nutrition research evaluates forage and alternative crops as livestock feeds. In food science, the application of microbiology has become an important component of studies on meat safety and preservation.

Animal agriculture is a large component of the American economy. It is a challenging and dynamic field with many employment opportunities. Think about a career in animal or food science.

If you have additional questions, please contact your local county Extension agent or your university's College of Agriculture student relations office.

The Environment and Resource Use

Beef cattle producers are committed to protecting the environment and the responsible use of natural resources. Since most cattle producers have chosen ranching/farming as their way of life, it is in their best interest to maintain and improve the land and other resources for which they are responsible.

On private lands, producers continually work to improve pasture and range conditions in order to boost productivity and to leave the land in better condition than they found it. Conditions on public land have steadily improved because of the use of modern land and forage management science techniques. Cattle production is an integral part of this management process. Land improvement is evidenced by the recovery of vegetation and native wildlife species. Government and range scientists view livestock as one of their best management tools for continuing to improve range conditions.

Well-managed livestock grazing improves vegetation health and diversity. Improvements made by cattle producers, such as water supplies and weed brush control, benefit both wildlife populations and livestock.

Ruminants, with their large fermentation vat (rumen), convert feedstuff unusable by humans into high quality, nutritious food for human consumption. Approximately 80 to 85 percent of nutrients consumed by cattle (all classes) come from sources not edible by humans. Less than half the dry matter produced by crops is edible by humans. Crop residues (corn stalks, wheat straw, etc.) can be used by cattle. Cattle also can help reduce waste disposal by using by-products of the food industry such as potato residue, sugar beet pulp, grain screenings, brewers' grains, and millers' residues.

Cattle can convert non-protein nitrogen into protein (beef). As discussed, cattle utilize nutrients in materials humans can't consume, and can produce more human edible protein and energy than they consume.

The nutrient content of 1 pound of beef is far superior for humans to the nutrient content of the 4.1 pounds of grain or the 20.3 pounds of grass used to produce that 1 pound of beef (carcass weight). In 1988-89, beef accounted for 28 percent of the grain consumed by animals (USDA data). Other percentages of grains consumed by animals include 28 percent for swine and 29 percent for poultry.

Only 15 percent of all grains produced in the U.S. are fed to beef cattle.

Beef production is an efficient use of energy. It accounts for less than .5 percent of our total U.S. fossil fuel energy use. More than 80 percent of the energy involved in food production, processing and preparation is used after the food leaves the ranch or farm. Most of the energy used to produce feed is solar energy, which is used for growing forages and feed crops. Grazing alone supplies 57 percent of the feed energy for producing beef. Large land areas of the U.S. won't support crop production (more than 85 percent of all grazing land in the U.S. is not suitable for cultivated crops). For the vast majority of grazing land, beef cattle and other ruminants are the only means of converting plant materials produced with solar energy into food for humans.

Cattle producers strive to use water efficiently to produce a safe and wholesome food product. A mature beef animal drinks 8 to 15 gallons of water per day, depending on temperature, humidity and type of feed consumed. The drinking water used in producing a 1,100 lb beef animal is estimated to be 7,300 gallons, including water for the mother cow and for the animal being raised for market. Much of this water returns to the ground as urine. Water used in producing livestock is not "used up." Water that falls on range/crop land or is irrigated onto crop land evaporates, runs off, or leaves plants through transpiration or evaporation. Water returns to earth as rain and recycles many times during a growing season—it is all part of nature's water cycle.

To put water usage by beef cattle in perspective, data from the Oregon State University Department of Bioresource Engineering suggests the average citizen in the Pacific Northwest uses 81,450 gallons of water per year for drinking, waste disposal, bathing, laundry, watering lawns, and other purposes. Other industry-type water uses include:

Use	Gallons
Manufacturing a car	30,090
Refining a barrel of crude oil	1,851
Processing a ton of cane sugar	28,100
Processing a can of vegetables	9.3
Processing a chicken	11.6

Young people involved in the 4-H beef project should use their resources wisely and make sure their management practices do not have a negative impact on the environment.

National Associations and Regional Organizations

American Angus Association
3201 Frederick Blvd.
St. Joseph, MO 64501
(816)233-3101

American Beefalo World Registry
116 Executive Park
Louisville, KY 40207-4201
(502) 897-1650

American Belgian Blue Association
PO Box 307
Sulphur Springs, TX 75482
(903) 885-2275 Fax: 795-4450

American Blonde D'Aquitaine Association
232 New York St.
Bismarck, NE 58504-6766
(701) 255-3555

American Braford Association
PO Box 690745
San Antonio, TX 78269-0745
(210) 696-8432

American Chianina Association
PO Box 890
Platte City, MO 64079
(816) 431-2808

American Gelbvieh Association
10900 Dover St.
Westminster, CO 80021
(303) 465-2333

American Galloway Breeders Association
N 21550 Hwy 95
Anthol, ID 83801
(208) 772-5586

American Hereford Association
PO Box 4059
Kansas, MO 64101
(816) 842-3757

American International Charolais Assoc.
PO Box 20247
Kansas City, MO 64195
(816) 464-5977

American Maine-Anjou Association
528 Livestock Exch. Bldg.
Kansas City, MO 64102
(816) 474-9555

Washington Cattleman's Association
PO Box 96
Ellensburg, WA 98926-0096
(509) 925-9871

American Murray Grey Association
Box 30085
Billings, MT 59107
(406) 248-1266

American Pinzgauer Association
21555 St., Rt. 698
Jenera, IA 45841
(419) 326-8711

American Polled Hereford Association
11020 NW Ambassador Dr.
Kansas City, MO 64153
(816) 891-8400

American Red Brangus Association
PO Box 1326
Austin, TX 78767
(512) 451-0469

American Romagnola Association
PO Box 450
Navasota, TX 77868
(409) 825-8082

American Salers Association
5600 S Quebec, Suite 220A
Englewood, CO 80111
(303) 770-9292

American Shorthorn Association
8288 Hascall St.
Omaha, NE 68124
(402) 393-7200

American Simbrah Association
1 Simmental Way
Bozeman, MT 59715-9733
(406) 587-4531

American Simmental Association
1 Simmental Way
Bozeman, MT 59715-9733
(406) 587-5431

American Tarentaise Association
PO Box 34705
N. Kansas City, MO 64116
(816) 421-1993

Barzona Breeders Assoc. of America
PO Box 631
Prescott, AZ 86302
(602) 445-5150

Idaho Cattleman's Association
PO Box 15397
Boise, ID 83715-5397
(208) 343-1615

Beef Industry Council
Nat. Livestock & Meat Board
444 N. Michigan Ave.
Chicago, IL 60611
(312) 467-5520

Beefmaster Breeders Universal
6800 Park Ten Blvd., No 290 W.
West San Antonio, TX 78213
(512) 732-3132

Cattlemen's Beef Board
PO Box 3316
Englewood, CO 80155
(303) 220-9890

Foundation Beefmaster Association
200 Livestock Exchange Bldg.
Denver, CO 80216
(303) 294-0847

Holstein-Friesian Association
1 Holstein Pl.
Brattleboro, VT 05302-0808
(802) 254-4551 F: 254-8251

International Braford Association, Inc.
422 E Main St. #218
Nacogdoches, TX 75961
(409) 569-8200

International Brangus Breeders
5750 Epsilon
San Antonio, TX 78249-3407
(512) 696-8231
Fax: 696-8718

International Salom Association
PO Box 218
Ardmore, OK 73402-0218
(405) 223-7500

National Cattlemen's Assoc.
1301 Pennsylvania Ave. NW
Suite 300
Washington, D.C. 20004
(202) 347-0228

U.S. Beef Breeds Council
3201 Fredrick Blvd.
St. Joseph, MO 64506
(816) 233-3101

North American Corriente Association
PO Box 9390
Casper, WY 82609
(307) 237-4491

Cowboys Then & Now Museum
729 NE Oregon St. #190
Portland, OR 97232-2107
(call for tour times & days)
(503) 238-7400

North American Limousin Foundation
PO Box 4467
Englewood, CO 80155
(303) 220-1693

Northwest Murray Grey Association, Inc.
PO Box 4
Glenns Ferry, ID 83623
1-800-437-6977

Northwest Pinzgauer Association
686 NW 32nd Ave.
Redmond, OR 97756
(503) 238-7400

Oregon Cattlemen's Association
729 NE Oregon St. #190
Portland, OR 97232-2107
(503) 238-7400 F: 238-7444

American Brahman Breeder Association
1313 La Concha Lane
Houston, TX 77054
(713) 795-4444

Piedmontese Association of the US
108 Livestock Exchange Bldg.
Denver, CO 80216
(303) 295-7287

Red Angus Association of America
4201 I-35 N. Interstate 35
Denton, TX 76207-7443
(817) 387-3502 F: 383-4036

Santa Gertrudis Breeders International
PO Box 1257
Kingsville, TX 78364
(512) 592-9357

Texas Longhorn Breeders Association of America
2315 N. Main, Suite 402
Ft. Worth, TX 76106
(817) 625-6241

U.S. Meat Export Fed.
600 S. Cherry St., Suite 1000
Denver, CO 80222-1716
(303) 399-7155

California Cattleman's Assoc.
1221 H Street
Sacramento, CA 95814
(916) 447-0845

Nevada Cattleman's Assoc.
419 Railroad Street
Elko, NV 89801
(702) 738-9214

Glossary of Cattle Producers' Language

If you are going to work with cattle, it is important that you learn commonly used terms particular to beef cattle.

Abomasum—a compartment of the stomach.

Abortion—a fetus delivered sometime after conception and before normal parturition.

Antibiotic—a product that destroys or inhibits growth of microorganisms, especially bacteria; product is produced by living organisms.

Artificial insemination—a process by which a technician introduces semen into the female reproductive tract (usually at the junction of the cervix and uterus).

Backfat—fat thickness measured at the twelfth 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; not capable of producing offspring.

Beef—meat obtained from beef cattle.

Bloat—abnormal condition in ruminants due to accumulation of gases; usually seen on the animal's upper left side (from rear view).

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, Short-horn, Angus, etc.

Bottom side of pedigree—inheritance from the dam's side of pedigree.

Bovine—term referring to all cattle.

Boxed beef—beef cuts packed in boxes for shipping from the packing plant to the retailer; usually primal and subprimal cuts, which are intermediate between carcass and retail cuts.

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, e.g., "She was bred (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—the 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.

Bullock—a young bull (less than 20 months of age).

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

BVD—Bovine Viral Diarrhea, an infectious disease of cattle caused by a virus.

By—designates the sire.

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

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

Carbohydrate—foods including starch, sugar, and cellulose which are broken down to simple sugars by digestion.

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, or 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.

Colostrum—milk given by the female immediately after delivery; milk is high in antibodies that give young offspring protection against disease.

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

Conceive—to become pregnant.

Concentrates—feed 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 undescended testes.

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.

Dark cutter—lean (muscle) of a carcass has a dark appearance (color); usually caused by stress (excitement) to animal prior to slaughter.

Dam—mother of a calf.

Dewlap—a hanging fold of skin under the neck of 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 Dogey—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.

Dehorn—process of removing horns from an animal.

Drench—administration of fluids through the mouth

Dressing percentage—percent of animal's live weight that becomes carcass weight when slaughtered (carcass wt./live wt. x 100 = dressing percent).

Dry cow—a nonlactating female.

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.

Dystocia—calving difficulty.

Edema—abnormal accumulation of fluid in intercellar tissue spaces of the body.

Embryo—developing young during pregnancy.

Embryo transfer—process of transferring fertilized eggs from one female (donor) to one or more recipient females.

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).

Eviscerate—process of removing internal organs during slaughter.

EPD (Expected Progeny Difference)—change in performance that can be expected from future progeny of a certain sire, compared with expected performance of future progeny of an average bull of the same breed in the same analysis.

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 (red meat) 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.

Femininity—developed female sex characteristics like udder development; refinement of skeletal features, head, neck, shoulders.

Fertility—an animal's ability to initiate, maintain and support reproduction.

Fertility test—test of semen for live sperm count, to determine 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.

Full feed—animals receiving all the feed they can consume.

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 control 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.

Heat—see Estrus.

Heifer—a young female cow prior to the production of its first offspring.

Herd—a group of cattle.

Herd bull battery—all of the bulls in service in particular herds.

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.

Hide—the skin of cattle.

Hindquarter—back half of a carcass (beef), usually divided between the twelfth and thirteenth ribs; loin and round.

Hooks—hip bones.

Immunity—an animal's ability to resist infection.

Inbreeding—when sire and dam are close relatives; see Close breeding.

Infection—body tissues invaded by microorganisms or parasites.

IBR—Infectious Bovine Rhinotracheitis or Red Nose; an infectious respiratory disease.

In heat—the time when a cow will accept service of bull.

Inheritance—the passing of genes from parent to offspring.

Lactation—the period the cow gives milk; from calving to weaning (about seven months).

Legume—a plant that belongs to the leguminosae family; e.g., alfalfa and clover.

Lice—wingless insect that has biting and sucking mouth parts; parasite on the animal's skin.

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 twelfth 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.

Maintenance—condition where animal's body is maintained without an increase or decrease in body weight.

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 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, etc.

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. This is where fat is deposited last, and the muscle can be seen more readily.

Nutrient—substance that nourishes the animal's body; end product of digestion.

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 female's genes.

Ovary—female reproductive gland where eggs are formed. Produces hormones progesterone and estrogen.

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.

Palpation—feeling by hand.

Parturition—act of birth.

Parasite—organism which lives in or on an animal at expense of the animal.

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.

Phenotype—visible or measurable expression of an animal's physical characteristics.

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; naturally hornless.

Post-legged—an animal having extremely straight hind legs.

Pregnant—heifer or cow that has conceived and not yet calved.

Prenatal—before birth.

Prepotent—above average in ability to transmit individual's desirable traits to offspring.

Production records—measure of a cow's productivity; based on the number and weaning weights of calves she has produced in her lifetime.

Progeny—the animal's offspring.

Progeny test—measure of an animal's offspring, usually bulls, generally to determine transmission of heritability traits such as rate of gain, conformation, meatiness, dwarfism, etc.

Prolapse—abnormal protrusion of an organ, such as the uterus or anus.

Protein—a nutrient composed of amino acids; contains about 16 percent nitrogen.

Protein supplements—a protein concentrate containing 32 to 44 percent protein; for example, cottonseed meal, linseed meal, soybean meal.

Puberty—age at which the animal's reproductive organs become functionally operative.

Purebred—not to be confused with thoroughbred, which is a breed of horses. A purebred is a member of a particular breed; e.g., 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.

Quality—overall excellence or superiority of an animal; general smoothness and neatness in appearance. Quality is the opposite of "coarseness."

Quality grade—grade given beef carcass; closely related to marbling, age of the animal, and color of

the lean. The most common quality grades are Prime, Choice, Select, Standard, Commercial, Utility, and Cutter. These grades reflect an appropriate amount of tenderness, flavor and juiciness within the meat.

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 issued a certificate that the animal is the offspring of registered parents and meets registration requirements.

Retail cuts—cuts of beef bought in a supermarket or meat market.

Retailer—a supermarket, or meat market, that sells beef to consumers.

Reticulum—a compartment of the four-part stomach of cattle or sheep.

Rib eye—the main muscle exposed when carcass is separated into front and hindquarters. Area of rib eye, sometimes called loin eye, at twelfth rib (used as indication of muscling and marbling).

Roughages—feeds high in fiber but low in energy such as hay, silage and pasture.

Round—a major wholesale cut in the hindquarter of a beef carcass.

Rumen—the 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, from being 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.

Scrotum—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.

Scurs—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—the act or ability of breeding.

Sheath—the tubular fold of skin into which the penis is retracted.

Shipping fever—a respiratory disease of cattle that is usually induced by stress.

Sickle hocked—hind legs curve under the body in a "sickle" fashion, as viewed from the side.

Sire—father of a calf.

Spay—surgical removal of ovaries.

Splay footed—front feet toe out.

Springer—a heifer or cow showing signs of advanced pregnancy; near to calving.

Stag—a male bovine castrated after sex characteristics are developed.

Steer—a male bovine castrated before sex characteristics are developed.

Stifle—a joint in the hindleg found between femur and tibia.

Stillborn—a calf that is born dead.

Stocker—where cattle are weaned and fed high roughages prior to entering the feedlot.

Stretch—body length, between shoulder and hooks.

Stress—a situation or condition that changes the animal's functioning or behavior.

Subcutaneous—directly under the skin; a subcutaneous injection is made under the skin.

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 musculing. Substance (bone) generally is associated with ruggedness throughout the body.

Switch—tip of tail where the hair is longest.

Tail-end—the 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 is used.

Top-end—the highest quality portion of group of animals; to top-out is to select from the best.

Trait—a 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.).

Up-standing—long-legged, rangy, tall.

USDA Grade—graded by United States Department of Agriculture.

TDN (Total Digestible Nutrients)—total amount of digestible protein, nitrogen-free extract, fiber and fat.

Top side of pedigree—inheritance from sire's side of pedigree.

Type—the physical conformation of an animal.

Udder—encased group of mammary glands of females.

Uterus—a section of female reproductive tract where young develop during gestation.

Vaccination—a process of administering vaccines or antigens.

Vaccine—a suspension of killed microbes or toxins given to an animal to induce active immunity.

Virus—an extremely small bundle of genetic material that multiply in a living cell; viruses cause a number of diseases in cattle.

Vitamins—organic compounds that facilitate specific functions in animals. Required in very small amounts.

Weaned—no longer nursing its dam. Weaning is the act of separating the calf from its mother so it can no longer nurse. Done at seven to eight months of age.

Weanling—a calf recently weaned.

Weight per day of age—a measure of weight gain; usually from birth to weaning, or from birth to one year old.

Well-bred—animal of high performing breeding lines of ancestry.

Yearling—an animal about one year old.

Yield grade—percent of carcass weight as trimmed, lean cuts from round, rib, loin, and chuck; used interchangeably with cutability.



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