

# Animals of Farms and Ranches

People have kept domesticated animals since the Stone Age, some 10,000 years ago. Farm animals provide us with meat, a staple of the diet in human cultures the world over. They also supply milk, eggs, wool, and hides, as well as a host of valuable by-products ranging from medicines and chewing gum to glue, candles, soap, brushes, feeds, cellophane, fertilizers, and chemicals. Some animals are used for transportation and work as draft animals, whereas others are trained for sporting events or kept simply because we enjoy them.

Domesticated animals are an important part of our society, for reasons of both economics and pleasure. This pamphlet will help you learn about the many kinds of useful animals raised on America's farms and ranches and will introduce you to principles of livestock selection, nutrition, health care, and management.



**Mare and foal**



**Shorthorn cows**

# Livestock Breeds

A Thoroughbred and a draft horse are both horses, but they are bred for different purposes—one for speed and the other for strength. A cow may be a milk cow or a beef animal. If it is a beef cow, its purpose is to produce calves that will be raised for meat. If it is a milk cow, it may be of a breed that produces a lot of milk with a fairly low butterfat content, or less milk with a high butterfat content.

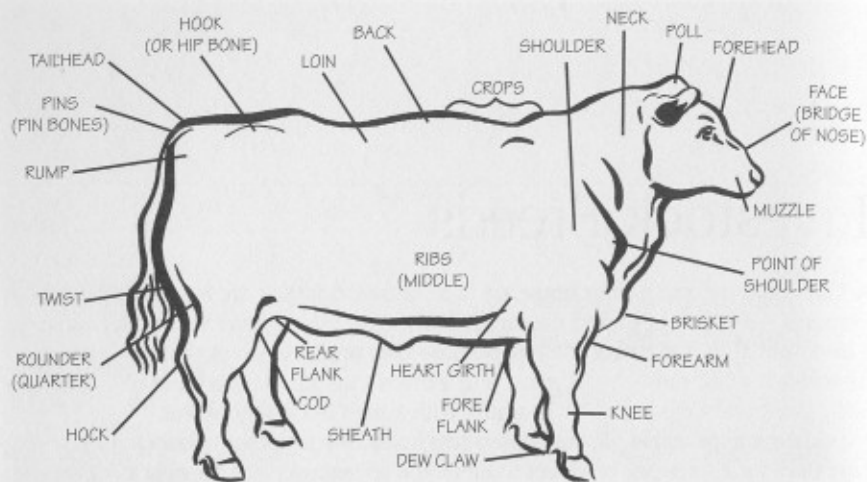
The same principle of *breed differences* holds true for other livestock. It is important for a livestock producer to know the advantages and drawbacks of various breeds. Different breeds are the result of many years of selecting animals for specific purposes. The choice of stock to raise will depend not only on the producer's preference but also on the characteristics of the breed, the area of the country in which the stock will be raised, and the strength of the market for that breed.

It's also important for the producer to know that great differences may exist between animals within a single breed. For example, a Holstein cow will give more milk on average than a Jersey. But a healthy, well-tended Jersey whose sire and dam were superior animals might be a bigger milk producer than a poorly managed Holstein whose parents had inferior genetics.

Livestock producers constantly try to upgrade their herds or flocks. They breed or buy animals that will improve the herd's production. They pay close attention to the condition of their stock, making sure that all animals are healthy and have good feed and shelter. These measures—good breeding and good management—are essential for success in livestock production.

Many breeds of livestock are raised in the United States. This chapter describes the principal breeds of beef cattle, dairy cattle, horses, sheep, dairy goats, hogs, and chickens. If you want to learn more about a breed, check the resources listed at the end of the pamphlet, or ask your merit badge counselor or county agent where you can get more information.





**Major External Parts of a Steer**

## Beef Cattle

People do not eat grass or hay. Grass and other roughages (coarse vegetation) are of no direct nutritional value to humans. Cattle, however, can convert roughages into meat, as well as milk and usable by-products. Cattle are the most efficient and economical way for people to get food from lands that are mountainous, wooded, or otherwise unsuited for growing crops but that will produce good supplies of grass and forages.

### Beef Breeds

Beef cattle are raised throughout the United States, in hot, cold, wet, and dry climates. Certain cattle breeds are better adapted than others to local conditions of weather and feed supplies and are better choices for certain areas of the country. Ranchers choose a breed of cattle on the basis of personal preference, environmental conditions, and important characteristics of a breed, such as its adaptability, body size, longevity, ability to efficiently reproduce, mothering and milking abilities, ability to gain weight, and other traits.

Beef breeds can be divided into four major groups: European breeds, Indian breeds, American breeds, and the so-called exotics. The European breeds and many of the exotics originally came from the countries of England, Scotland, France, Switzerland, and Germany. Although many breeds originated in England, the term "English breeds" generally refers to the Angus, Hereford, and Shorthorn.



**Beef cattle grazing on seeded range**

## Table 1. Major Breeds of Cattle

### Beef Cattle

#### *European Breeds*

Angus  
Devon  
Hereford  
Red Angus  
Shorthorn

#### *Indian Breeds*

Brahman

#### *U.S.-Developed Breeds*

Beefmaster  
Brangus  
Polled Hereford  
Santa Gertrudis

#### *Exotic Breeds*

Blonde d'Aquitaine  
Charolais  
Chianina  
Galloway  
Gelbvieh  
Highland  
Limousin  
Maine-Anjou  
Murray Grey  
Piedmontese  
Polled Shorthorn  
Simmental  
White Park

### Dairy Cattle

Ayrshire  
Brown Swiss  
Dutch Belted  
Guernsey  
Holstein  
Jersey  
Kerry

### Dual-Purpose Cattle (used for both beef and dairy)

Milking Shorthorn  
Normande  
Pinzgauer  
Red Poll  
Tarentaise

## ANGUS

Records of Angus cattle date to the 16th century in Scotland. The breed was developed from the native cattle of Aberdeenshire and Angusshire. Angus came to the United States in 1873. They are polled (hornless), solid black in color, and tolerate cold climates well. Angus steers average 1,200 pounds at harvest. They mature early and are noted for their ability to produce high-quality beef. The breed is popular in the central, southern, and western United States.

Angus often are used in crossbreeding programs with the Hereford to produce the "black baldy," a black animal with a white face, which is popular with cattle producers. *Crossbreeding* is the mating of two different breeds in an attempt to produce animals that possess the advantages of both breeds.



Angus cow and calf

## HEREFORD

The Hereford is an old breed that originated in Hereford County, England. Until the middle 1700s, the cattle were bred mainly as draft animals. Gradually, breeders began improving the Hereford for beef, changing the body structure toward more smoothness and less weight. The first Herefords in the United States arrived in 1817. The Hereford has a red coat with a white face, crest, brisket, belly, and switch (tail) and usually has white below the knees. Its horns curve downward and slightly forward.

Hereford cows take good care of their offspring, and the breed is popular under range conditions where good nurturing may be critical for the survival of the calf. The cattle will graze over a vast range seeking grass and roughage. They are especially popular in the West and Southwest because of their foraging ability.



Hereford bull

## SHORTHORN

The Shorthorn originated on the northeastern coast of England. Its development as a breed began in about 1600. Later, these cattle were found in Scotland and, in 1783, in America. Shorthorns were popular with America's early settlers, who valued the breed for meat and as draft animals for wagon and plow. The cattle have long been noted for their adaptability, nurturing ability, reproductive performance, good disposition, feed conversion (pounds of feed needed per pound of weight gain), and longevity.

Midwesterners discovered in 1870 that hornless cattle appeared from time to time in horned herds. Thus, Polled Shorthorns were developed. Both Shorthorns and Polled Shorthorns will adapt to a wide range of climatic conditions, from the heat of the southern states to colder mountain weather. In color, the cattle are combinations of red, white, and *roan* (a mixture of red and white hairs).



Shorthorn cow

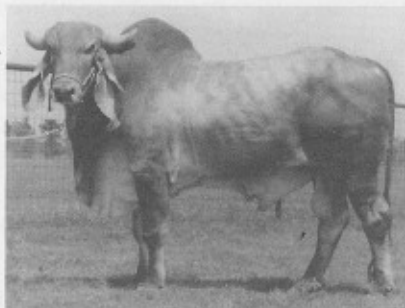


Shorthorn bull

## BRAHMAN

The American Brahman was developed from cattle imported from India and Brazil. The first Brahman-type seed stock arrived in the United States in the late 1800s. The Brahman has a large hump above the shoulders and long, narrow ears that droop downward. Coat color varies from shades of gray to black, but some Brahmans have red and speckled coats. Dark skin pigmentation, particularly around the eyes, helps to provide protection from the sun.

The Brahman has a genetic resistance to diseases such as tick fever and pinkeye but does not produce as high quality a carcass as other breeds. These cattle are well-adapted to hot climates and tolerate parasites better than some breeds. Brahman cattle are particularly popular in the hot and humid southern states. The breed does not tolerate extreme cold as well as the breeds that originated in cooler climates.



Brahman bull



## SANTA GERTRUDIS

The American breed Santa Gertrudis was developed in the early 1900s in South Texas on the King Ranch. Shorthorn cows bred to Brahman bulls produced cattle that could do well in the hot, humid, insect-ridden South and also have good-quality carcasses. In 1920, the bull calf that would become the foundation sire of the Santa Gertrudis breed was calved. Named "Monkey" for his playfulness, the bull was approximately  $\frac{1}{2}$  Shorthorn and  $\frac{1}{2}$  Brahman.

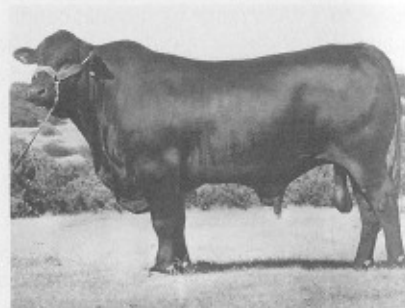
Santa Gertrudis cattle are dark red in color. They usually have horns but some are polled. Although they tolerate hot weather well, they also perform well in colder climates. Most of the Santa Gertrudis registered in the United States are in the southern states. Mature bulls weigh up to 2,600 pounds, and cows average 1,200 to 1,400 pounds. Market weight is about 1,100 pounds.



Santa Gertrudis bull

## BRANGUS

Early crossbreeding work between Angus and Brahman cattle started in 1912. By 1949, a cross was stabilized at  $\frac{1}{2}$  Angus and  $\frac{1}{2}$  Brahman, and the new breed was named the Brangus. The cattle are solid black and polled. Brangus are now found in nearly every state in the United States and in Canada, Mexico, Australia, Central America, Argentina, and Zimbabwe. The cattle tolerate hot weather very well. The Brangus is an efficient breed, combining the best characteristics of the Brahman and Angus.



Brangus bull

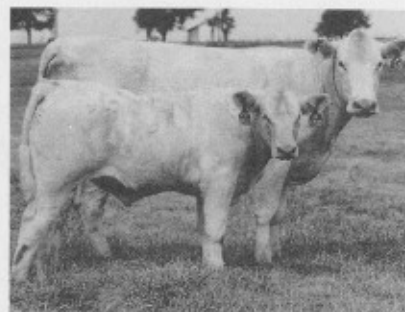
## POLLED HEREFORD

The Polled Hereford developed directly from the American Hereford. In 1898, a young Hereford breeder from Iowa saw some hornless cattle being exhibited at the Trans-Mississippi World Fair in Omaha, Nebraska. By 1901, he established the Polled Hereford breed with naturally hornless whiteface cattle he had located and bought. The two breeds look very much alike, except that the Polled Hereford has no horns.

## CHAROLAIS

The Charolais was developed in central France. The King Ranch of Texas is given credit for importing the first Charolais bulls to the United States in 1936. More purebred Charolais were brought to North America in the 1960s.

The Charolais is large, long-bodied, and heavily muscled. Its coat is white or a light straw color. The Charolais generally has horns, but some are polled. The breed is known for its long and thick muscling in the loin and round, with a very small amount of fat thickness. The meat is fine-textured and of excellent quality. Bulls weigh as much as 2,600 pounds, and mature cows may weigh 1,700 pounds. The breed is marketed at 1,250 to 1,350 pounds. Charolais cattle are noted for their ability to grow rapidly and produce lean, tender beef.



Charolais cow and calf

## CHIANINA

The Chianina comes from Italy. It is one of the oldest breeds in the world, dating to before the Roman Empire. The Chianina was introduced in the United States in 1971. For centuries, Chianina were bred as draft and beef animals.

The cattle are off-white in color, with black on the tongue, palate, nose, and switch and around the eyes. Mature bulls weigh up to 3,500 pounds; females up to 2,400 pounds. Calves average 90 to 100 pounds at birth. These animals grow rapidly, reaching a market weight of about 1,350 pounds. The Chianina is a good beef breed, well-muscled with a thin layer of fat. The breed is known to add genetics for fast growth and lean beef and is frequently used in systematic crossbreeding programs.



Chianina bull

## LIMOUSIN

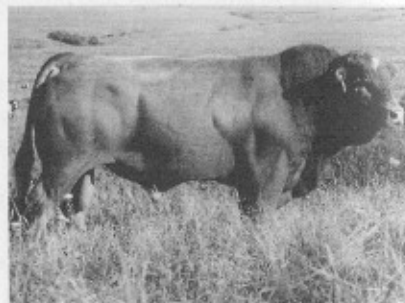
The Limousin breed, developed in France, was introduced into North America in 1968 when a bull arrived in Canada. The first Limousin bulls imported permanently into the United States did not arrive until the fall of 1971. The cattle are horned and red-gold with a light buckskin color on the underside, legs, and muzzle. Through crossbreeding, however, there are now polled Limousin and black Limousin. The breed often is referred to as the "carcass breed" because of the extra thickness and muscling typical of the cattle. Mature bulls average 2,400 pounds; cows, 1,350 pounds.



Limousin bull

## SIMMENTAL

The Simmental has long been a popular breed in Europe. The first purebred Simmental bull arrived in the United States in 1971. In Europe, the purebred cattle vary in color from light to dark red, with distinct areas of white. The horns, legs, and tail generally are white, and there may be white patches on the flanks and behind the shoulders. This basic color pattern was kept when the Simmental was crossed with the Hereford breed in the United States.



Simmental bull

U.S. beef producers have also crossed Simmentals with breeds such as the Angus and Charolais, and the resulting cattle include red and black individuals. Mature Simmental cows weigh 1,300 to 1,800 pounds; bulls from 2,400 to 2,800 pounds. The average weight at birth for bull calves is 90 pounds and for heifer calves, 85 pounds.

## Registered Herd or Commercial?

Registered purebred cattle herds usually are smaller than commercial operations. For the breeder to be successful, there must be a market for the type of purebred animals produced. The advantage of a purebred program is that the breeder is able to produce a generally superior

animal that will bring a premium price. A purebred herd can be the best way for breeders to receive the greatest income from a small acreage.

Managing a registered herd takes effort, however. The registration procedures, the paperwork involved in keeping breeding records, and the certification of animals demand careful attention to detail and a large investment of time.

In a commercial cattle herd made up of crossbred beef cattle, the major bloodlines of the cattle may be recognizable—for instance, white-face cattle that are mostly Hereford and black cattle that are mostly Angus—but the animals are not pedigreed. The modern commercial beef herd is usually made up of crossbred cattle because of their increased productivity and adaptability to various market and production conditions. The herd may be confined on improved pasture or allowed to run on open range. One cow on well-managed, improved pasture may get all of the nutrients she needs for herself and her calf on as few as one to three acres of good farmland, but in some areas of low rainfall and poor plant growth, she may need to graze 100 acres or more.

Talk with ranchers and breeders in your part of the country about the beef breeds that are most common and popular in your area. Discuss with them the advantages and disadvantages of breeding purebred animals versus raising a commercial crossbred herd.



## Dairy Cattle

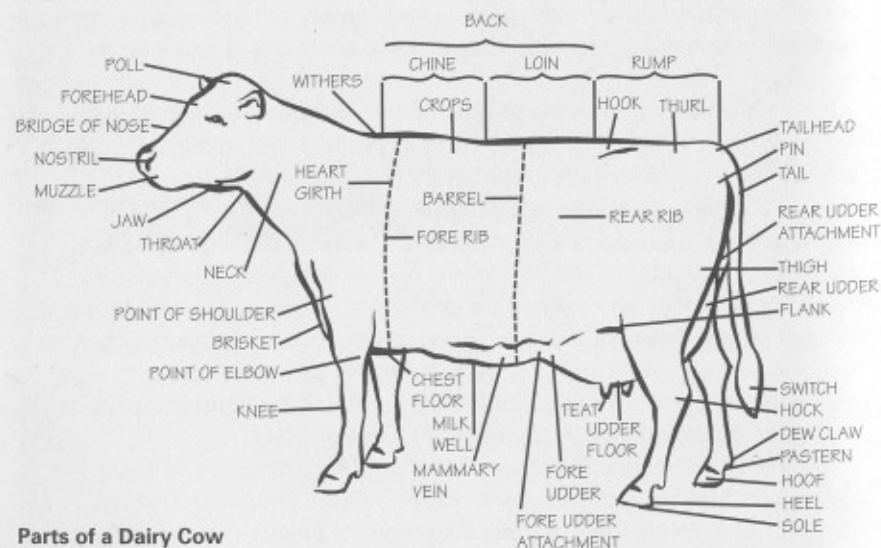
Milk, a source of high-quality protein, minerals, and vitamins, is an essential part of the human diet. Milk is produced and processed in all 50 states, although Wisconsin, California, New York, Minnesota, and Pennsylvania lead the United States in milk production. Fluid milk, half-and-half, whipping cream, yogurt, butter, cheese, and ice cream are a few of the products we enjoy thanks to the dairy industry.

### Dairy Breeds

In the United States there are six commonly recognized dairy breeds: Ayrshire, Brown Swiss, Guernsey, Jersey, and Milking Shorthorn. Holstein and Brown Swiss produce greater amounts of milk, whereas Jersey and Guernsey give milk with a higher butterfat percentage. More butterfat in milk gives a "richer" taste.

A dairy farmer should pick the breed that best fits local conditions and markets. In some production areas, nearly all of the milk produced is used as fluid milk. In other areas, most of the milk goes to make cheese and other dairy products. Holsteins are the dominant breed especially in fluid milk markets.

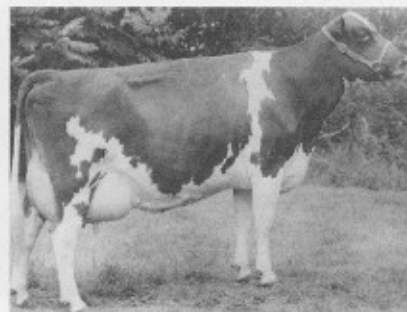
Whatever the breed, a dairy producer should always try to get good *individual* animals. Then, through good record-keeping, careful breeding, and good care, the producer will try to improve the herd by increasing the production of milk energy and milk protein, by using sires that pass along superior genetics for those qualities.



Parts of a Dairy Cow

### AYRSHIRE

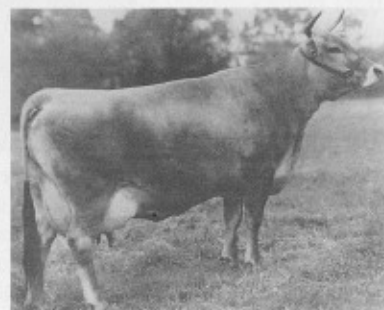
The Ayrshire originated in Scotland. Today it is found throughout the United States in modest numbers, with concentrations in the Northeast and Midwest. Ayrshires are well-built, of medium size, strong, and rugged, with symmetrical udders that are well-attached to the body. Almost all Ayrshires are dehorned as calves because their long, curved horns are impractical in dairy operations. At birth, calves weigh 60 to 80 pounds. Mature cows weigh about 1,200 pounds. Ayrshires usually are light to deep reddish-brown or mahogany, or a combination of red and white, with distinctive markings.



Ayrshire cow

### BROWN SWISS

The Brown Swiss is one of the oldest dairy breeds in the world and was developed on the mountain slopes and valleys of Switzerland. The first Brown Swiss to be introduced into America came to Massachusetts in 1869 and 1870. In color the cattle are solid brown, varying from very light to dark. Calves weigh an average of 90 pounds at birth, and mature cows reach weights of about 1,500 pounds. Brown Swiss are known for their calm, unexcitable dispositions.



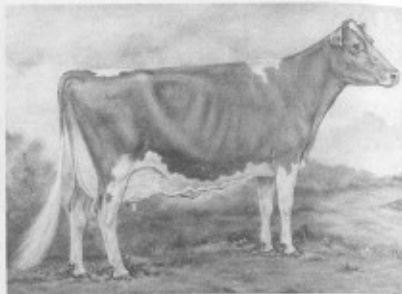
Brown Swiss cow

### Horned or Hornless?

All breeds of dairy cattle have the genes for growing horns, but nearly all are dehorned soon after birth in modern U.S. dairy herds. Horns present management problems because they can cause injury to other animals and to the people who work with the cattle.

## **GUERNSEY**

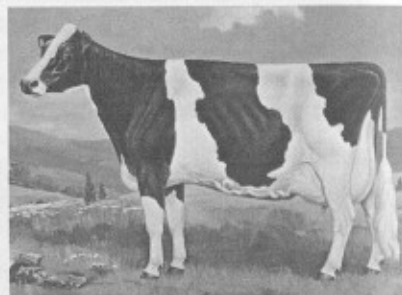
The Guernsey originated on the Isle of Guernsey off the northern coast of France. Guernseys are found throughout the United States but are most numerous in the central states. They are medium-sized cattle, gentle and easily handled, with a mature cow in milk weighing about 1,150 pounds. Calves weigh 55 to 85 pounds at birth. Heifers mature early. Guernseys are fawn-colored with white markings. Skin color is golden yellow or pinkish. The milk of these cattle is especially yellow in color.



**Guernsey cow**

## **HOLSTEIN**

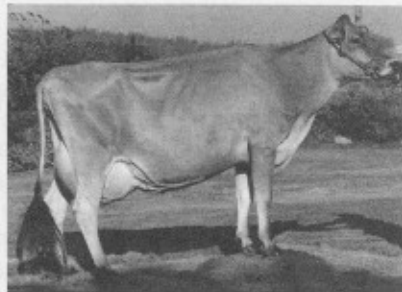
Holsteins descended from cattle developed in the northern part of the Netherlands, especially the province of Friesland, and northern Germany. This is the most popular dairy breed in the United States and appears in all states in great numbers. It is also the largest breed, with mature cows weighing about 1,500 pounds. Most Holsteins are black and white; some are red and white. Calves weigh 70 to 105 pounds at birth. The cattle are noted for producing large volumes of milk with low butterfat.



**Holstein cow**

## **JERSEY**

The Jersey came from the Isle of Jersey, located in the English Channel between Great Britain and France. Jerseys—the smallest in stature of the major U.S. dairy breeds—often were kept aboard sailing ships to supply milk during long sea voyages, and probably came to America with early colonists. The first recorded arrival of the cattle in America was in 1850. The Jersey is medium-brown to fawn in color. The cows produce a very rich milk that is high in butterfat and protein. Mature cows weigh 900 to 1,100 pounds. Calves weigh from 50 to 80 pounds at birth. Heifers mature early, calving for the first time at 20 to 24 months of age.



**Jersey cow**

## **Dual-Purpose Breeds**

Cattle originally had three uses for humans: they provided milk, meat, and labor. Eventually, horses and then machinery replaced cattle for labor, and so they were often developed for the single purpose of providing either meat or milk. Some breeds, however, are still important as dual-purpose breeds, and can be raised as either beef or dairy cattle as the rancher chooses.

## **MILKING SHORTHORN**

The milking Shorthorn was an important dual-purpose breed for the pioneers in America, who depended on it for both milk and meat. In early American history, the breed was often called the Durham cow. Modern Milking Shorthorns are raised mainly to produce milk. In color they are red or white, or a combination of red and white (roan), with no black markings. Mature cows weigh about 1,400 pounds. Calves weigh from 70 to 90 pounds at birth.



## Horses

In 1920, 27 million horses lived in the United States. By 1960 only a little more than three million were left. The big drop was caused by the internal combustion engine. With the invention of the truck, tractor, and automobile, horses were no longer needed for heavy farm work and transportation.

In recent decades, however, the horse has made a dramatic comeback as millions of people have discovered the fun of owning a horse for sport and pleasure. Most horses today are kept for riding and racing, but some are still workhorses. The cow horse is one working horse that has retained most of its usefulness. A good cow horse is still needed to work cattle in many cattle operations.

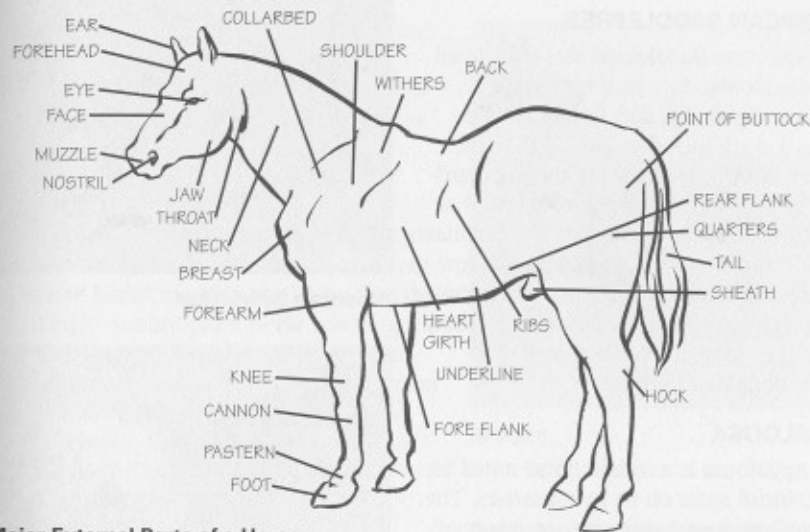
### Descriptive Terms

Horse enthusiasts use several terms to describe the sex, age, or condition of a horse. A *stallion* is a sexually intact male horse more than three years of age, and a *stud* is a stallion used for breeding. A *colt* is an intact male up to three years of age. A *gelding* is a castrated male horse of any age. A *mare* is a mature female, and a female horse age three years or younger is a *filly*. A *foal* is a male or female less than one year old; a *weanling* is a just-weaned young horse of either sex.

In color, horses may be various shades of black, brown, *chestnut* (reddish-brown), *dun* (yellowish-gray), gold, gray, *sorrel* (yellowish-brown), and white. Bay horses have a brown coat and black *points* (legs, mane, and tail). Chestnut horses may have flaxen (pale yellow) or sorrel manes and tails, but not black points. Many gray horses are born a dark color and turn a lighter shade as they grow older. Some gray horses turn white by the time they are fully grown. *Roan* horses have a yellowish-brown or reddish-brown coat sprinkled with white or gray hairs. *Calicoes* are predominantly white with red and black patches.

Palominos have a golden coat and a light blond or silvery mane and tail. Most have no white except on the face and on the legs below the hocks and knees. Almost every horse breed except the Thoroughbred has palominos. The color type was developed by breeders in the United States and Mexico.

The terms used to describe the markings on a horse's face or legs include *baldface* (a mostly white face), *blaze* (a large white patch on the face), *star* (any small white patch on the forehead), *snip* (any small white patch near the muzzle), and *sock* (a white patch above the foot).



Major External Parts of a Horse

### Horse Breeds

The United States has more breeds and varieties of horses than anywhere else in the world. Some breeds came from other parts of the world, and some were developed in this country for specific uses.

Table 2. Major Breeds of Horses

#### Light Horses

American Saddlebred  
Tennessee Walking Horse  
Morgan  
Quarter Horse  
Arabian  
Thoroughbred  
Hackney  
Standardbred  
Appaloosa  
Paint

#### Heavy Horses

Shire  
Clydesdale  
Belgian  
Percheron  
Suffolk  
American Cream

#### Ponies

Shetland  
Welsh  
Hackney  
Connemara  
Pony of the Americas



## AMERICAN SADDLEBRED

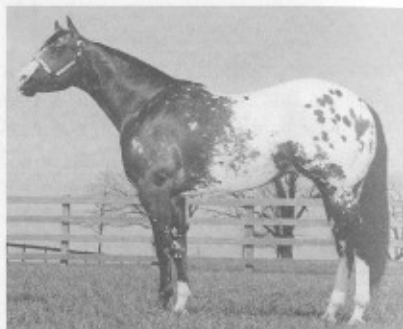
The American Saddlebred was developed during colonial days in Virginia, West Virginia, Kentucky, and Tennessee. The original stock included Thoroughbreds, Canadian pacers, Morgans, and Standardbreds. The Saddlebred was recognized as a distinct breed around 1900. It is popular today for its easy, comfortable ride. Most American Saddlebreds are used for recreational riding and are popular in the show ring. They may be chestnut, bay, gray, black, or golden in color.



American Saddlebred

## APPALOOSA

The Appaloosa is a saddle horse noted for the colorful spots on its rear quarters. The original stock probably came to this continent with Spanish explorers. In the 19th century, most Appaloosas were owned by the Nez Percé Indians of the Northwest; later, the breed became widely scattered. Today, Appaloosas are mostly stock and pleasure horses.



Appaloosa

## ARABIAN

As the name implies, the Arabian was developed in Arabia. It has been bred in the United States since the colonial period. George Washington rode a gray Arabian charger. The breed is known for speed, stamina, beauty, and alertness. Noted as an "easy keeper," the Arabian can be maintained on less-than-ideal pasture or grain rations, making it an economical horse to own.



Arabian

## MORGAN

The Morgan was founded by a single outstanding horse. A bay stallion named Justin Morgan, born in 1789, was renowned in early America for his strength, speed, and stamina. Reputedly, Justin Morgan could outrun, outpull, and outjump any horse. He had the remarkable ability to pass on his likeness and his athletic strengths to his offspring. His descendants, in turn, passed these traits to their

offspring, giving rise to the Morgan breed. Morgans are popular as saddle horses, trotting racers, carriage horses, and show horses, and some are used as cow horses on cattle ranches.

## PAINT

From prehistoric cave paintings, Egyptian wall murals, and statues found in ancient Chinese burial mounds, we know that the strikingly marked paint horse has long been associated with human civilization. The Spanish conquistadors brought paints and other horses to the Americas in the 16th century. By the 1800s, paints (also called *pintos*) were favorite mounts of Indians and cowboys.

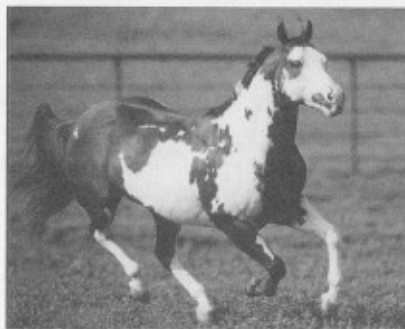
Today, paints are popular saddle, show, and stock horses. They have two-toned coat markings of white and a darker color. The two major color patterns of the paint are called *tobiano* (usually red or sorrel on the sides, with white extending over the back), and *overo* (white on the sides with the color over the back). Paints are deep-chested, well-muscled, powerful animals that perform well under saddle. A calm disposition and quiet intelligence make the paint a good choice as a pleasure mount.

## QUARTER HORSE

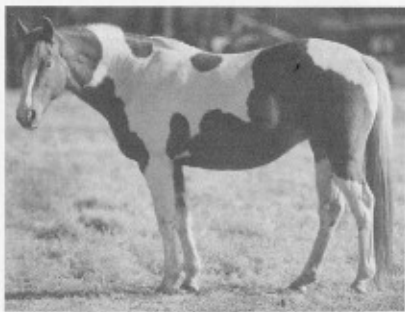
The quarter horse was the first horse breed established and developed in the Americas. Stallions of Arab, Barb, and Turk breeds shipped to the Americas by Spanish explorers and traders were crossed with a band of mares that arrived from England in 1611. The result was a compact, heavily muscled horse that could run short distances faster than any horse before it. The breed soon had a reputation as a short-distance runner,



Morgan



Paint horse (Overo color pattern)



Paint horse (Tobiano color pattern)

famed for colonial-era match races in Virginia and the Carolinas. The usual race distance was one-quarter mile; hence the breed's name.

As settlers moved west and vast cattle ranches began stretching across the plains, the quarter horse became famous for its "cow sense," which made it invaluable for working cattle on the open ranges of the western states. Today, the quarter horse is still used in ranch work and is the most common breed in rodeo events. Pleasure riders find the quarter horse surefooted and intelligent, as well as a sturdy, dependable mount for weekend trail rides.



Quarter horse

### **SHETLAND PONY**

The Shetland pony was developed in the Shetland Islands about 100 miles north of Scotland. Small and rugged, it originally was used in the coal mines to pull heavy loads in tight spaces. Shetlands come in almost all horse colors. This pony is widely used today as a child's mount and show pony.



Shetland pony

### **STANDARD BRED**

A Thoroughbred stallion named Messenger bred in the 18th century to native mares that were natural trotters or pacers produced the Standardbred. The breed is used almost exclusively in harness racing, which has been popular in the United States since the early 1800s.



Standardbred

### **TENNESSEE WALKING HORSE**

The smooth and easy gait that made a day's work in the saddle comfortable for plantation overseers continues to be the chief characteristic of the Tennessee walking horse. This horse is today a favored mount of park rangers, mounted police officers, field trial enthusiasts, hunters, endurance riders, competitive trail riders, and show-ring performers. The Tennessee walker is also known for its docile temperament.



Tennessee walking horse

### **THOROUGHBRED**

The Thoroughbred was developed in England for racing and arrived in the United States in the 18th century. The Thoroughbred is known for great heart, and shows tremendous speed and stamina as a racehorse in flat racing and jumping. Although nearly all Thoroughbreds are bred for racing, some are used as saddle horses and polo mounts. They tend to be somewhat nervous and excitable.



Thoroughbred

### **DRAFT HORSE**

The draft horse is not a breed but a type of horse that includes several breeds. The draft horse was the tractor and truck of the 19th century and before. Today, few draft horses are work animals, but some are kept for show. The most popular breeds today are the Belgian, Clydesdale, Percheron, Shire, and Suffolk. The Belgian and Clydesdale are favorites for pulling wagons in parades. Draft horses may weigh 2,200 pounds or more.



Belgian draft horse

## Sheep

Sheep are good foragers and can be productive on poor-quality vegetation. Millions of acres in the United States cannot be used profitably by other domestic livestock. Sheep can be produced economically on land that is virtually useless for crops.

Of the 200 or more sheep breeds scattered throughout the world, more than 35 are found in the United States. Most are of British or European origin.

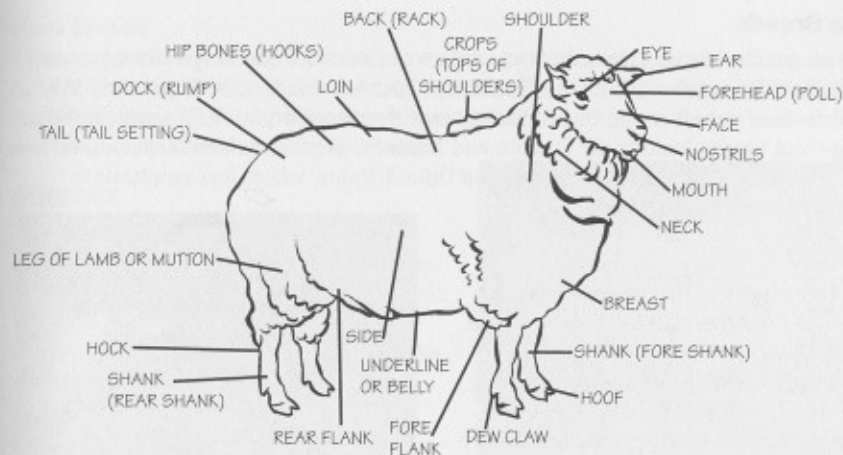
The genetic diversity among breeds is tremendous. Some have fine wool, and others have hair. The mature weight of some breeds is as little as 100 pounds, whereas others may weigh four times as much. Some breeds average one lamb per ewe (mature female), whereas the ewes of other breeds commonly produce three or more lambs at each *lambing* (birth).

Various breeds differ in their herding or flocking instincts. Some tend to herd or flock together better than others, making them better adapted to the open range. Fewer than 10 sheep breeds are of commercial importance today, but the great genetic diversity of sheep allows breeders to make changes rapidly to meet changes in economic conditions and the demands of the market.

For successful sheep breeders, the market is an important factor in breed selection. Today there are three major markets for sheep: raising lambs for meat, producing wool, and raising show lambs.

Other important considerations when choosing a sheep breed include

- The breed's adaptability to the local environment, taking into account temperature (climate) and the availability of forage
- The breed's reproductive efficiency, such as number of lambs born and raised per lambing season or year
- Growth rate and carcass quality (faster growth and more lean meat with less fat in the carcass are most economical)
- Wool production (although today's relatively low prices for wool mean that the income from wool sales is only a fraction of the total income to the sheep producer)
- Personal choice, for the sheep producer may choose a breed because of personal reasons that override other considerations



Major External Parts of a Sheep

Table 3. Major Breeds of Sheep

Ewe Breeds (fine wool)	Ram Breeds (meat-type)	Dual-Purpose Breeds
Debouillet	Cheviot	Cheviot
Finnsheep	Columbia	Columbia
Merino	Cotswold	Corriedale
Rambouillet	Dorset	Dorset
Romanov	Hampshire	Romeldale
	Leicester	Polwarth
	Lincoln	Targhee
	Oxford	
	Romney	
	Shropshire	
	Southdown	
	Suffolk	

Sheep breeds are classified according to their role in crossbreeding and commercial use. *Ewe breeds* are generally the white-faced breeds of fine-wool type. *Ram breeds* are meat-type sheep used primarily as sires for market lamb production. *Dual-purpose breeds* are used as either ewe or ram breeds depending on the production situation.



## Ewe Breeds

Ewe breeds developed primarily from crosses of fine-wool and long-wool types and highly prolific breeds such as the Finnsheep, Booroola Merino, and Romanov. All the fine-wool breeds in the United States trace their ancestry to the Spanish Merino. Long-wool breeds include the Lincoln and Romney, popular in New Zealand and Australia but not commonly raised in the United States, where less emphasis is placed on wool production.

### MERINO

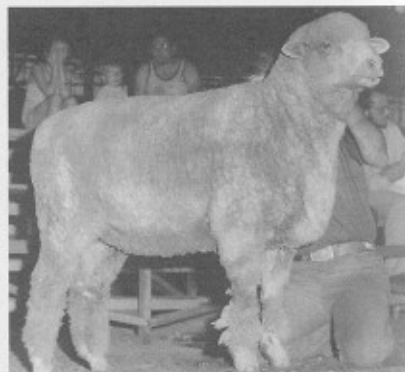
The three types of this breed—types A and B of the American Merino, and type C, the Delaine Merino—differ chiefly in the degree of skin folds or wrinkles. The Delaine Merino has the smoothest skin. Delaine Merinos produce the best quality wool in this country. These sheep are strong and hardy, and herd well. Mature rams of the Delaine type weigh from 150 to 200 pounds and ewes from 110 to 150 pounds. Most rams are horned. The Merino was first imported into the United States in the 18th century.

### RAMBOUILLET

The Rambouillet is a good wool producer and also offers acceptable meat. They herd well and are popular in range country. Rambouillets are noted for their high-quality wool, ability to adapt to severe range conditions, and size (they are the largest of the fine-wool breeds). Rams weigh 225 to 275 pounds and ewes 140 to 200 pounds. Most rams have large, spiral horns, but some are polled. The breed was developed from Merino stock imported from Spain into France about 1786 and came to the United States in the 19th century.



Delaine Merino ram



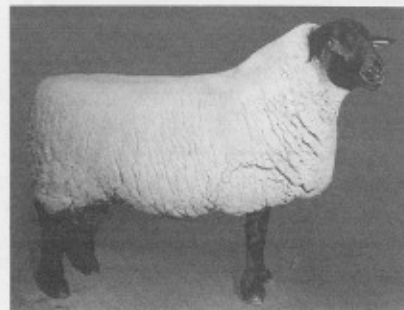
Rambouillet ewe

## Ram Breeds

The ram breeds are selected on the basis of size, growth rate, carcass quality, and ease of lambing. The predominant ram breeds in the United States are the Suffolk and Hampshire. The Columbia, Shropshire, Oxford, Southdown, Dorset and others are used as ram breeds to a lesser extent.

### SUFFOLK

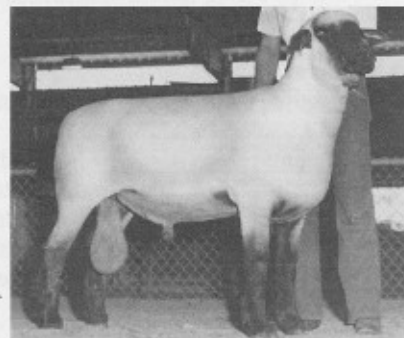
The Suffolk was developed in England and brought to America in the late 1880s. This large, hardy breed tolerates heat well. It adapts well to the range conditions of the western states. The ewes are excellent mothers. Lambs mature rapidly. The Suffolk has a black face, ears, and legs and is about the size of the Hampshire. Both sexes are hornless.



Suffolk ram

### HAMPSHIRE

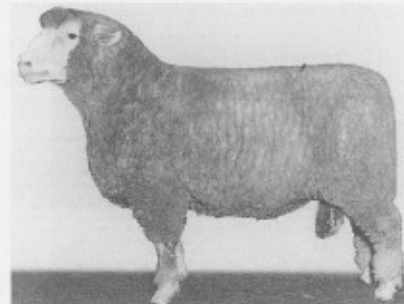
Originally from southern England, the Hampshire is a large and active sheep with a mild disposition. Mature rams weigh 275 pounds or more and mature ewes 200 pounds or more in breeding condition. The ears and face are dark and relatively free of wool, as are the legs below the knee and hock. The breed is hornless. The Hampshire is well-muscled and noted for its vigor and strength. These sheep do well on the range; ewes lamb easily and have heavy, vigorous lambs.



Hampshire ram

### COLUMBIA

The Columbia originated in Wyoming and Idaho from the crossing of Lincoln rams and Rambouillet ewes. It has a white, open-faced, polled head. It adapts well to range conditions. Mature Columbia rams weigh 225 to 275 pounds and ewes 125 to 190 pounds. The breed produces a high-quality fleece. Ewes produce a wool clip of 12 pounds or more annually.



Columbia ram

## SHROPSHIRE

The Shropshire was developed in England and first appeared in the United States about 1855. In size, it ranks between the Hampshire and the Southdown. It is a good meat animal, and shearing yields about 8 to 12 pounds of wool annually. Shropshire lambs grow rapidly. In this breed, both sexes are polled.

## OXFORD

The Oxford was developed in south central England and arrived in this country in 1846. Rams weigh 200 to 275 pounds and ewes 150 to 225 pounds. Both sexes are polled. The Oxford shears heavier than many others used as ram breeds, producing 10 to 12 pounds of wool a year.

## SOUTHDOWN

An excellent meat breed, the Southdown also produces fine-quality wool, but in small amounts. It has a smaller-size body, with deep, firm flesh. Rams weigh 190 to 230 pounds and ewes 140 to 180 pounds. Both sexes are polled. The lambs mature early. This breed is popular with members of 4-H clubs and Future Farmers of America. The Southdown is a native of southeastern England and had arrived in the United States by the 17th century.



Shropshire ewe



Oxford ram



Southdown ram

## DORSET

The Dorset originated in England and is noted for its out-of-season breeding habits, mothering ability, milking ability, and carcass quality. Multiple births are common, giving Dorsets the nickname of "the mother breed." These sheep are found in nearly all parts of the United States except the mountain states and the extreme southeastern region. The Dorset is a medium-sized sheep, with good body length and muscling. Ewes weigh from 150 to 200 pounds and rams from 225 to 275 pounds. Animals in show condition can exceed these weights.

## Dual-Purpose Breeds

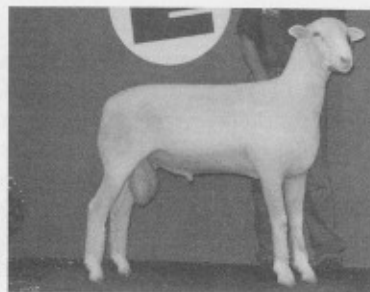
The breeds classified as dual purpose are usually crossed with the ewe breeds to produce crossbred females for market lamb production. Breeds in this category include the Columbia, Dorset, Corriedale, and Cheviot.

## CORRIEDALE

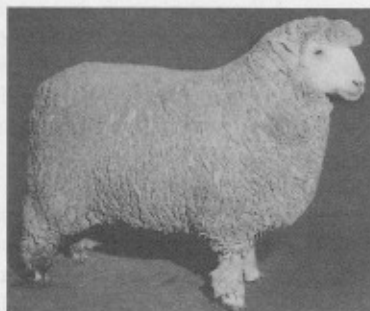
The Corriedale was developed in New Zealand from Lincoln rams crossed with Merino ewes. The breed was imported into Wyoming in 1914. Corriedales produce both good meat and dense fleece of good quality. They may shear 10 to 12 pounds of wool a year. Mature rams weigh 185 to 225 pounds, and ewes range from 125 to 185 pounds. Both sexes are polled.

## CHEVIOT

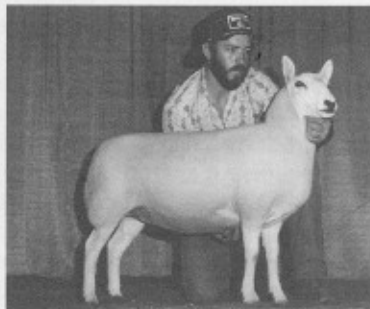
The Cheviot is a small, hardy sheep with excellent meat. Mature rams weigh 160 to 200 pounds; ewes, 120 to 160 pounds. Fleece weight usually is light, about 5 to 7 pounds annually. The face and legs have no wool. Both sexes are polled. The breed is noted for its vigor, good milking and nurturing ability, quality meat, and ability to adapt to rugged grazing conditions. Cheviots originated in the border country between Scotland and England and arrived in the United States in 1838.



Dorset ram



Corriedale ram



Cheviot ewe



## Dairy Goats

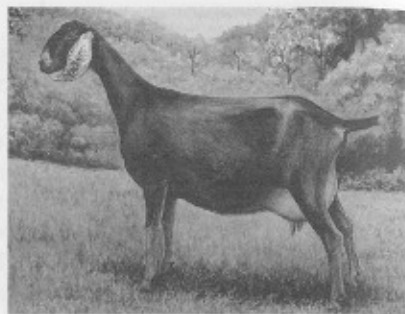
Goats are grazing animals that can eat a wide variety of plants. Some cattle and sheep ranchers use them to clear brush and other unwanted plants from pastures. Goats actively hunt for food and can cover a wide area in search of scarce forage. They thrive in harsh environments such as rocky and mountainous areas and dry or semitropical climates.

Domestic goats produce milk, meat, leather, and wool. In the United States and Canada, the most popular milk-producing goat is the Anglo-Nubian, also called the Nubian. It was developed by breeding British dairy goats with goats imported from Africa and India. Other major breeds of dairy goats are the Saanen, Toggenburg, and Alpine, all of which were developed in Switzerland.

In its composition, goat's milk differs slightly from cow's milk. It contains more vitamin A than cow's milk, but smaller amounts of vitamin C and certain B vitamins. Babies, the elderly, and people with stomach ailments may find goat's milk easier to digest than cow's milk. People who are allergic to the protein in cow's milk may be able to drink goat's milk safely. However, those who are allergic to the *lactose* in cow's milk cannot drink goat's milk either, because this milk sugar is the same in both kinds of milk.

Cheeses made from goat's milk have a creamy consistency and a wide range of flavors. Popular goat's milk cheeses include blue, chèvre, feta, and ricotta.

An adult male goat is called a *buck* or a *billy goat*. An adult female is a *doe* or a *nanny goat*. A goat less than a year old is called a *kid*. The mature weight of modern dairy breeds is between 130 and 200 pounds.

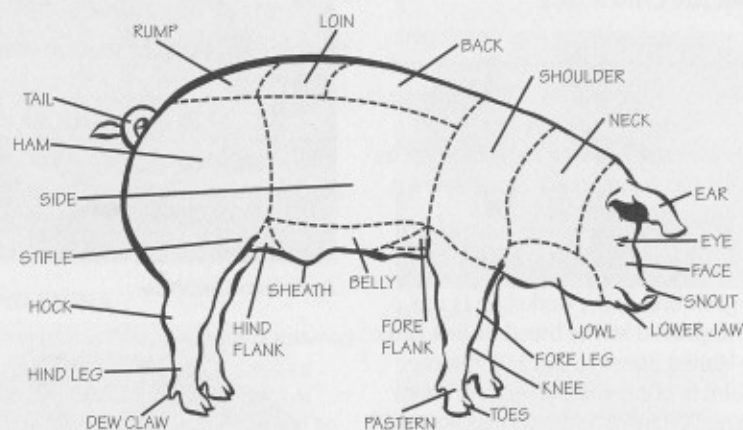


Nubian dairy goat

## Hogs

Hogs breed rapidly, require little space, and reach market size in a relatively short time. These qualities make them a natural choice for small farmers who want to turn home-raised grain into a marketable meat product quickly. Intensive commercial production, however, is rapidly replacing the small pig farmer. Small farmers may typically raise pigs for market from fewer than 50 to 100 sows, whereas intensive commercial producers often have from 500 to 10,000 sows.

Hogs have been in America since Hernando de Soto brought some, and lost them to the wilds, in the early 1500s. Pioneers brought hogs to Jamestown in 1609. Settlers moving westward spread them throughout the United States. By 1840, the center of production had shifted to the Corn Belt of the Midwest, where it remains today, although swine make important contributions to the economy of every state.



Major External Parts of a Hog

Swine producers today breed for a meat-type hog with a good yield of the lean cuts—ham, loin, picnic shoulder, and Boston butt. Quality hogs are well-muscled and not fat.

## Swine Breeds

As is true for other livestock, there is no “best” breed of swine. A hog producer must base breed selection on the growth rate of the breed, the number of pigs in an average litter, and the desirability of the meat, as well as personal preference.

## Table 4. Major Breeds of Hogs

### British Breeds

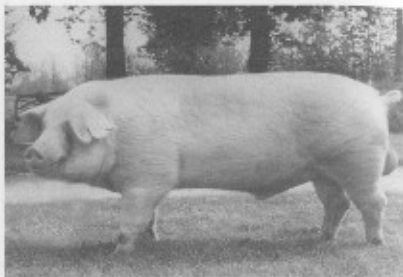
Berkshire  
Yorkshire  
Tamworth

### U.S.-Developed Breeds

American Landrace  
Chester White  
Duroc  
Hampshire  
Poland China  
Spotted Swine

## AMERICAN LANDRACE

The American Landrace was developed from Landrace stock from Denmark and other European countries. The Landrace is white. Mature boars weigh 700 to 900 pounds and sows 550 to 750 pounds. The Landrace has a long body and is known for its large litter size.



American Landrace

## BERKSHIRE

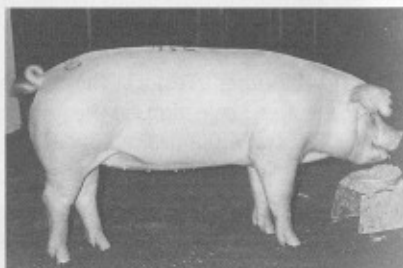
An English breed, the Berkshire is the oldest improved swine breed. It first came to the United States in 1823. A mature Berkshire is of medium size, with boars weighing 700 to 900 pounds and sows 600 to 750 pounds. The breed is long-bodied and produces fine quality meat. Berkshires are black with white on the face, tail, and all four feet.



Berkshire

## CHESTER WHITE

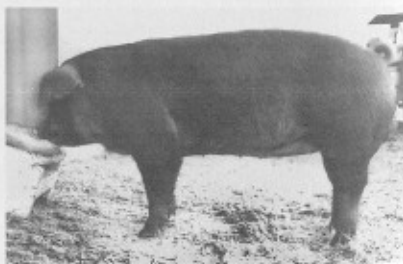
The Chester White originated in Chester County, Pennsylvania. Because of their mothering ability, durability, and soundness, Chesters have kept their popularity with thousands of pork producers. Sows have large litters. Chester White carcasses are noted for large hams.



Chester White

## DUROC

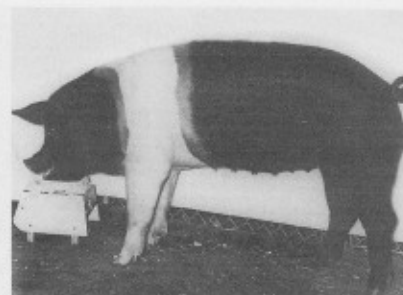
The Duroc originated in New Jersey and New York in the mid-1800s. A popular breed, the Duroc is all red, the shade varying from light to dark. It is a hardy breed noted for an excellent rate of weight gain and feed efficiency (that is, the number of pounds of feed needed to produce 1 pound of weight gain). Sows have large litters and are good nurturers. Durocs mature early.



Duroc

## HAMPSHIRE

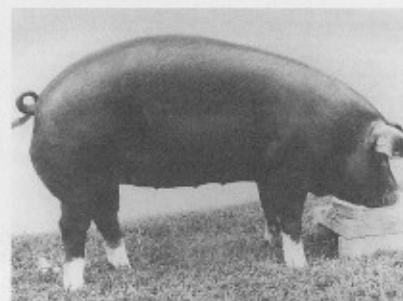
The Hampshire is recognized by its black body with a white belt running over the shoulders and front legs. It was developed from English breeds in Boone County, Kentucky, during the 19th century. Hampshires are noted for leanness, durability, carcass quality, and efficiency. They are large-framed and deep-bodied.



Hampshire

## POLAND CHINA

The name of the Poland China is misleading because no swine from Poland or China contributed to its development. It originated in Ohio and was named by a Polish farmer. The Poland China is black with white feet, snout, and tip of tail. The breed is known for producing a heavy ham carcass.



Poland China

## SPOTTED SWINE

The Spotted swine has changed drastically in type from the short, fat hog of its origin in the early 1900s to a long-sided, fast-growing, hardy swine breed with excellent carcass merit. The Spots is known as a highly productive hog.

## HYBRIDS

In addition to the pure breeds of swine, many hybrids have been developed by commercial breeding companies. The exact genetic makeup of these hybrid pigs is generally treated as a company secret. The goal is to produce pigs that excel in certain characteristics, such as carcass leanness, growth rate, feed efficiency, and reproductive rate. The white breeds have been used extensively as sows for mating to boars of the colored breeds such as the Berkshire, Hampshire, and Poland China.



Spotted



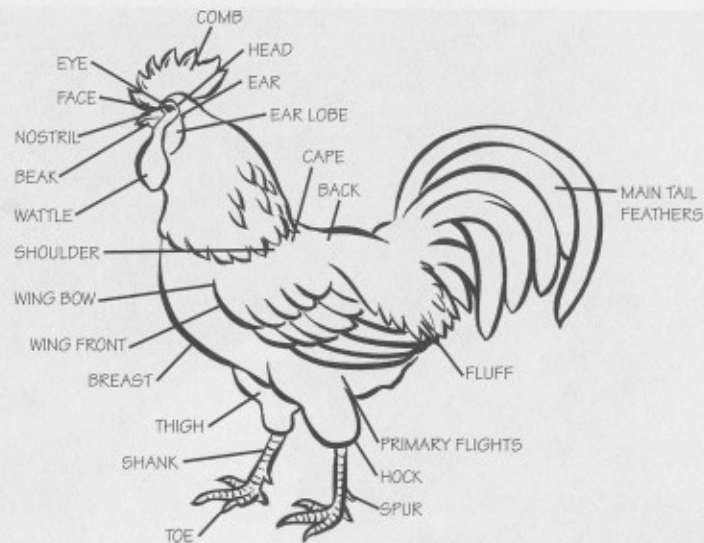
White Leghorn pullets

## Poultry

Poultry kept for human use includes turkeys, geese, ducks, guinea fowl, and chickens. This pamphlet will mention only chickens. If you wish to learn more about the others, check with your local library, merit badge counselor, or a local poultry producer.

Chickens produce meat and eggs, two of the world's most efficient sources of human food. In the United States, many poultry farms are in the states of California, Georgia, Arkansas, Pennsylvania, Indiana, Alabama, North Carolina, Minnesota, Texas, Ohio, and Missouri.

The varieties with the greatest commercial importance in the United States are the White Leghorn, the White Plymouth Rock, the Barred Plymouth Rock, the Rhode Island Red, the New Hampshire, and the Dark Cornish. Most of the chickens in the United States are hybrids. The high-quality, high-producing birds of the modern commercial egg farm and broiler farm are the products of careful selection and crossbreeding practices.



Major External Parts of a Chicken

## Broilers

Commercial poultry farms normally buy chicks from companies that specialize in chick production for either meat or egg production. For broiler (meat) production, *straight-run* (unsexed) chicks usually are ordered.

## Layers

Brown eggs are popular in some areas, but most commercial egg farms use hens that produce white eggs from the White Leghorn breed or from inbred strains of the Leghorn breed. Today's commercial producers use high-producing laying hens that have been intensively bred for production efficiency.

# Good Management Practices

Animals have certain physical needs that must be met if they are to grow and develop normally, stay healthy, and be productive. For livestock, the needs include feed and water, sanitary housing, and health care. Meeting these needs can prevent most losses from death and lowered production in farm animals.

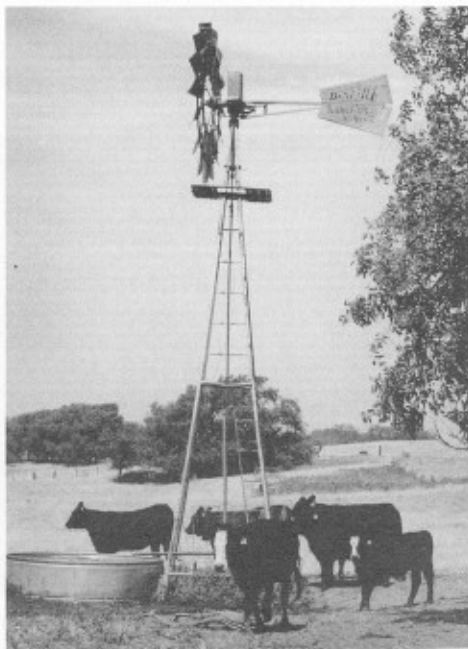
Proper management practices are different for different stock. Cattle, horses, sheep, goats, hogs, and poultry have the same basic needs, but the way they are met is not the same. This chapter will cover these needs in general terms. For more detailed information, talk with your merit badge counselor, county agent, or a livestock producer. You will also find help in the list of resources at the end of this pamphlet.

## Feeding and Watering

A balanced diet is essential to good health. The nutritional needs of different animals vary, but all animals require the following.

**Water.** Fresh, clean water is a must at all times for every animal. A cow, for instance, will drink about 12 gallons of water a day—more in hot weather than in cold. She can live for weeks without food but only a few days without water, which she needs to regulate body temperature, dissolve and carry nutrients, and eliminate wastes.

**Carbohydrates.** Sugars, starches, and cellulose are carbohydrates that the body “burns” (oxidizes) to provide the energy used for growth, fattening, and reproduction.



**Livestock need fresh, clean water available to them at all times.**



**Fats.** This class of nutrients mainly provides high amounts of energy but also provides the small amounts of *fatty acids* required for proper growth.

**Proteins.** These complex compounds provide the *amino acids* essential for normal growth and functioning of an animal. The body uses amino acids mainly to build soft tissues such as muscles.

**Vitamins.** These complex substances are vital to normal growth and health. Vitamins are required in small amounts and play specific roles in the body.

**Minerals.** Normal body function requires elements such as iron, copper, phosphorus, potassium, selenium, calcium, and iodine. More than 16 minerals are known to be essential in an animal's diet.

Without a balanced diet of all these nutrients, animals will grow and perform poorly, and fall prey to diseases. Horses with poor diets may give birth to weak or deformed foals. Cattle may get milk fever, ketosis, grass tetany, rickets, or night blindness. Swine develop anemia, ulcers, and scours and may have dead litters. Poultry may lay fewer eggs or eggs that won't hatch. Lambs may develop white muscle disease.



Hay is good feed for cattle because the ruminant digestive system contains microorganisms—bacteria and protozoa—that can break hay down into usable forms of energy, protein, vitamins, and minerals.

## Digestive Systems of Livestock

Feed is the most important factor in the growth, health, and productivity of all kinds of livestock. It also is a major expense on any stockfarm or ranch; for most types of livestock, feed is the producer's biggest expense.

Livestock producers must feed their animals well, but they must keep costs down to make a profit. Producers can achieve both good nutrition and good economy if they understand how animals use feed and convert it into profitable meat, milk, eggs, wool, or offspring.

The digestive systems of farm animals are of two kinds: ruminant and non-ruminant. *Ruminants* are cud-chewing, cloven-hoofed animals, including cattle, sheep, and goats. (Deer, bison, antelope, camels, giraffes, and llamas also are ruminants.) All other livestock, including horses, swine, and poultry, are *nonruminants*.

The main difference between ruminant and nonruminant animals is that the ruminant's "stomach" has four compartments, whereas the nonruminant's has only one. The result is that the types of feed they can use are quite different, even though both kinds of animals need water, protein, carbohydrates, fats, minerals, and vitamins.

### Digestion in Nonruminants

The digestive process of simple-stomached animals is similar to that of humans. In fact, a pig's digestive system is much like a person's, and so are the pig's nutritional needs.

Let's follow the digestive process of another nonruminant—the horse. The process starts in the mouth, as the horse chews the feed and moistens it with saliva. Chewing causes some physical breakdown of the feed, and saliva eases the feed's passage down the *esophagus* (the tube linking the mouth with the stomach).

Once in the stomach, the feed mixes with gastric juices that break down fats and proteins. In the *small intestine*, which is more than 20 feet long, enzymes continue to break down proteins, fats, and sugars into simpler substances that can be absorbed into the bloodstream and used by the body.

Digestion and absorption of nutrients continue as food passes through the cecum and *colon* (the large intestine). The *cecum* houses microbes (bacteria and protozoa) that help to break down forages such as hay and grass into nutrients that can be absorbed. The horse's cecum is relatively large; therefore, the horse can use large amounts of forage. The cecum of swine and poultry (and humans) has a limited capacity; therefore, these animals cannot use forage well. Undigested fiber and wastes are expelled through the rectum.

For its size, the horse has a small stomach. This means that it must eat relatively small amounts over a long period instead of large amounts in a short time. If a horse is not fed, its stomach will be empty within 24 hours.



## Digestion in Ruminants

A cow eats by wrapping its tongue around grass and twisting it off. The animal chews its food very little before swallowing it, but does mix the grass with saliva in the mouth to lubricate it and make swallowing easier.

The feed travels down the esophagus to the *rumen*, also called the paunch or fermentation vat. The rumen may hold as much as 50 gallons. This large vat contains microorganisms—bacteria and protozoa—that actively break down the forage the cow eats. These tiny organisms digest the roughage for their own benefit, but in the process they make substances such as volatile fatty acids, B vitamins, and amino acids that the cow needs. Then, when the organisms die, the cow digests them and absorbs the nutrients released from their tiny bodies. There may be 200 billion microorganisms per teaspoon living in a cow's rumen.

A calf is not born with the microorganisms needed to digest forages. It must *inoculate* its digestive system by eating or drinking with more mature animals. In this way, a calf picks up the necessary microorganisms, which gradually develop in the young animal's rumen. Calves do not start ruminating until they're about three months old, and they digest only small amounts of roughage at that age. By weaning, a calf's digestive system is functioning completely.

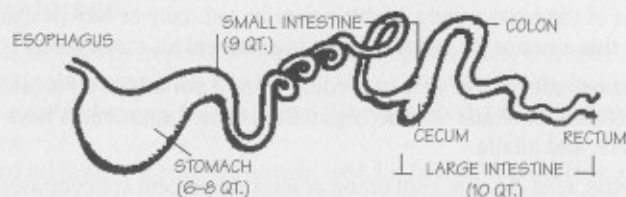
The rumen of a mature cow acts as a storage vat. When the cow finishes feeding, it *regurgitates* (casts up) a cud of partially chewed feed and fluid. Forcing the cud up the esophagus from the rumen to the mouth, the cow chews it more thoroughly and then reswallows it. Digestion by the microbes continues until the particles of feed are small enough to flow down the digestive tract through the small opening of the rumen and *reticulum*.

The next stop is the *omasum*, which removes most of the water. From there the food passes into the fourth compartment—the *abomasum*.

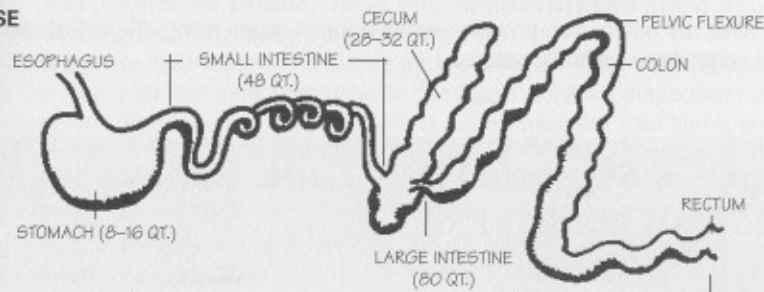
Most microbial digestion is completed by the time the food reaches the abomasum, often called the *true stomach* because it performs much the same function as the simple stomach of the horse and pig. In the abomasum, digestive juices continue to break the food into its nutrient building blocks, which are then absorbed through the wall of the small intestine. Undigested material moves through the cecum and large intestine and is expelled as manure through the rectum. A limited amount of microbial digestion continues in the cecum of the ruminant—less than the horse, but more than the pig.

Ruminants can go for longer periods without food than nonruminants, provided they have adequate rations when they are fed. (A ruminant's stomach takes 72 hours to empty.) Ruminants also are able to use more roughages such as grass and hay, which require more digestive action than concentrate feeds such as grains. Only microbes produce the enzymes that digest forage; the animal itself does not.

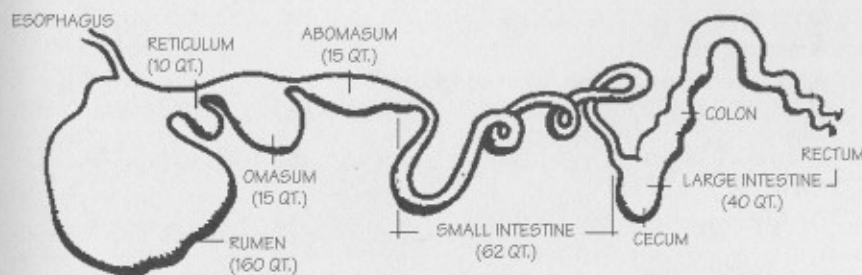
### PIG



### HORSE



### COW



Digestive systems—Pig, horse, and cow

## Feeding Cattle

The rations fed to cattle depend on the intended goal—fattening a steer for market, feeding dairy cows to increase milk production, feeding show animals, or wintering cattle, for instance. Rations often are prepared with computers and complicated nutritional data, but you can use some rules of thumb to plan basic rations.

- Any sign of unthriftiness (lacking in vigor or health) in cattle should prompt a change in the ration if parasites and disease can be ruled out as the cause of the problem.

- Two percent of the body weight of cattle may be fed daily as hay (roughage), or three times this amount for silage. (*Silage* is a fermented, moist feed.)
- Protein requirements can be met by feeding 1½ to 2 pounds of oil meals, or three times this amount of alfalfa or other leguminous hay. Leguminous hays include vetch, clovers, and alfalfa.
- To fatten cattle, feed a ration containing at least 60 percent concentrates (grains) and 40 percent roughages (hay or silage), in amounts equal to 3 percent of the body weight.

With any ration, also provide needed mineral supplements. Table 5 shows some suggestions for basic rations.

**Table 5. Suggested Beef Cattle Rations (pounds per day)**

	Supplementing a 1,000-lb. cow	Fattening a 600-lb. calf
1. Nonleguminous hay	20	10
Oil meal	2	2
Grain		
(shelled corn or ground grain sorghum)	—	6
2. Nonleguminous hay	—	3
Silage	60	20
Oil meal	2	1.5
Grain (corn or grain sorghum)	—	6
3. Nonleguminous hay	16	8
Leguminous hay	6	2
Oil meal	—	1.5
Grain (corn or grain sorghum)	—	6
4. Leguminous hay	6	10
Silage	48	—
Oil meal	—	1
Grain (corn or grain sorghum)	—	7

## Feeding Horses

A horse's dietary needs depend on the animal's age and how it is used. Working horses need more energy than idle horses. Mares with foals at their side need more protein than unbred mares. Young horses generally need a more nutritious diet than older horses.

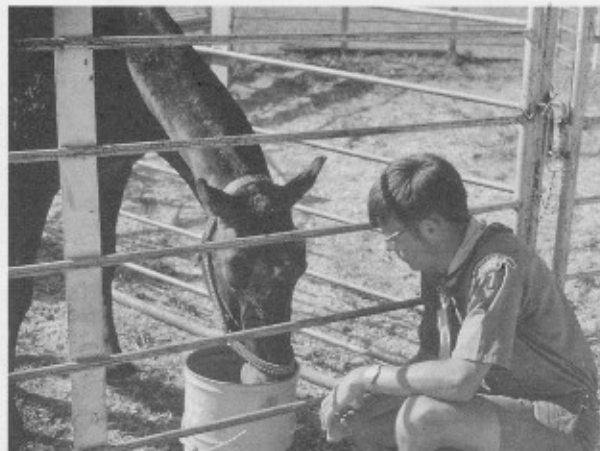
Linseed oil meal is a popular protein feed for horses. It promotes a shiny coat. Grains—especially oats, and to a lesser degree corn, barley, and wheat—provide energy. An iodized, trace-mineral, free-choice salt block will prevent mineral deficiencies. Lush pastures will provide a horse with the necessary vitamins. If no pasture is available, green, leafy forages may be substituted.

Horses can use high-energy concentrate feeds but require some bulk (forage) to keep the food from becoming compacted in the digestive tract. Compaction can cause dangerous disorders such as *colic*. (Colic is acute abdominal pain and is associated with feeding rations that are too low in roughages.) Oats is an excellent grain for horses because it is high in nutrition and somewhat bulky, and they like to eat it.

A horse kept for recreational riding should do well on a simple ration of 95 percent oats and 5 percent linseed meal, or half oats and half sweet feed (premixed corn, soybeans, linseed, wheat, and vitamin-mineral supplements), plus a bright, clean, leafy hay for roughage. Table 6 gives sample rations for horses doing light work and for stallions and mares used for breeding.

Do not feed hay on the ground. This practice can lead to worm infestations and may cause "sand colic," a common digestive disorder in horses. Sand colic can be easily prevented by feeding hay in bunks or hay nets. Keep feed boxes free of moldy feed. Moldy feeds often cause chronic coughing.

Feed and water horses regularly, not less than twice a day. Do not let a horse drink its fill of water after vigorous exercise. Always walk a horse to cool it off before letting it drink.



**Table 6. Suggested Horse Rations (per day)**

	1,000-lb. saddle horse	1,200-lb. broodmare and stallion in service
1. Alfalfa hay	10 lb.	14-16 lb.
Oats	4 lb.	10 lb.
Mineral supplement	—	2 oz.
2. Alfalfa hay	—	10 lb.
Grass hay	14 lb.	4 lb.
Oats	5 lb.	5 lb.
Corn	—	3 lb.
Barley	—	2 lb.
Wheat bran	—	2 lb.
3. Alfalfa hay	10 lb.	5 lb.
Grass hay	—	8 lb.
Oats	3 lb.	12 lb.
Barley	1 lb.	—
Wheat germ oil	—	1 oz.
Mineral supplement	—	2 oz.

## Feeding Sheep

Rations for sheep are often mostly roughages. Sheep thrive on good pastures. Generally, ewes need 4½ to 5 pounds of dry feed or its equivalent each day. This may be made up of legume hay, grass hay, and silage, or merely a good pasture. Often, ½ to 1½ pounds of grain are added to the daily diet of ewes during pregnancy, after lambing, and just before breeding. Finishing lambs normally will require 3 to 4 pounds daily of a ration containing at least 70 percent grain.

## Feeding Dairy Goats

Feed adult dairy goats good-quality hay and grain. Make abundant, clean water and salt available to them at all times. Kids can either get milk from their mothers or be raised by hand using a bottle or pan. They should be fed 1 to 2 quarts a day of goat's milk, cow's milk, or goat- or sheep-milk replacer. The first week of life, they need milk three to four times a day, then twice a day for as long as three or four months. Starting when they're one week of age, offer kids leafy hay and grain. After weaning, they need 1 pound of grain a day and all the hay they will eat.

## Feeding Hogs

Hogs are easy to feed if you use commercially available premixed, balanced feeds that contain all the necessary nutrients. It is possible to simply fill a self-feeding hopper once or twice a week, and check daily to see that the hoppers are not clogged with feed and to ensure that the hogs have fresh water.

Three basic commercial premixed rations are available for feeder pigs. Weaned piglets younger than five weeks of age may be fed *prestarter rations*, which have 20 to 22 percent protein. Slowly switch the pigs, by the time they're five weeks old, to *starter rations*, which are up to 20 percent protein. At 65 to 70 pounds, switch them to a *grower ration* that provides about 16 percent protein. Continue this ration until slaughter, or put hogs weighing 120 pounds on *finisher rations* containing 14 percent protein.

Some swine producers use these rules:

- Give 1 pound of feed for each 30 pounds of body weight from 120 pounds to market weight.
- Feed only the amount eaten in 20 to 30 minutes.
- Finishing hogs (120 to 240 pounds), while on full feed, will eat 4 to 6 pounds of feed each day per 100 pounds of live weight.

Swine rations normally will contain only concentrates. The fiber content of swine rations must be less than 5 percent. If you feed hogs roughages, feed only those of high quality, such as alfalfa leaf meal, legumes, or grazing cereal grains.

## Feeding Chickens

Corn is the most important grain used in poultry rations, followed by sorghum (milo) and wheat. Soybean oil meal often is used as a protein supplement. Supplements such as meatpacking by-products and fish meals provide some of the protein in poultry rations. Common calcium supplements include crushed oyster shells and ground limestone.



**Chickens require fresh, clean water at all times.**

The science of feeding chickens has become highly technical as our knowledge of nutrient requirements grows. Today, almost all commercial growers purchase their feed rather than mix their own.

The high water content of the eggs and meat makes fresh, clean water doubly important for poultry. It should be available at all times.



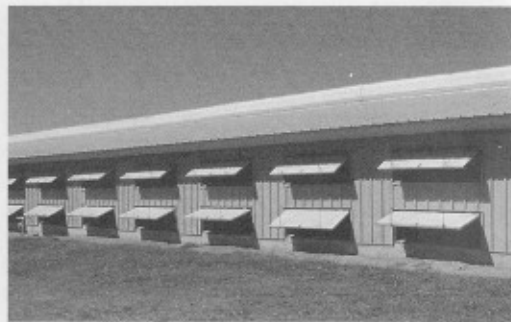
## Housing

Every kind of livestock needs protection against severe weather and predators, shelter for times of illness, and protection for its young. The type of shelter needed depends on the type of livestock, its size and feeding habits, and the climate. When you provide barns or other living quarters for animals, make sure they are clean and dry, with no sharp edges or nails that might injure the animals.

Good drainage is important. See that all waste material is removed regularly and spread on harvested fields or on unused pastures where the sun will dry it. This treatment kills disease-carrying organisms, and the wastes provide valuable nutrients to enrich the soil.

For range cattle in most areas, open shelters are adequate. Beef cattle on pastures with some natural windbreaks such as treelines or cliffs may not need buildings for shelter.

Sheep are hardy but should have shelter to protect them from cold or rain. A plain, open shed facing away from the wind will be enough in most areas.



Layer house



An open shed facing away from the wind provides needed shelter for farm animals.

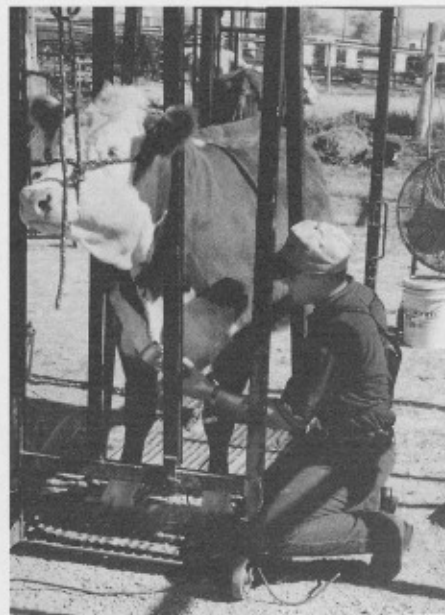
Dairy goats need an exercise area and a sturdy shelter free of drafts. Goats are curious, active creatures and will try to escape from enclosures. The best way to keep them in is to use solid board fencing or electric fences.

Contrary to popular belief, a hog does not prefer to live in a mud wallow. Swine actually are quite clean and do best in sanitary, cool, well-kept quarters. People should wear clean footwear when working in farrowing houses or other buildings where hogs are kept because small pigs are highly susceptible to disease. Sanitation is especially important in swine management because hogs normally are kept in large numbers in close confinement.

Layer houses provide nests, roosts, feeders, and waterers. Broiler chickens are housed in broiler houses, 30 to 40 feet wide and as long as necessary to hold the number of birds desired. In houses where the environment is completely controlled, 0.6 square foot per chicken is considered the minimum space requirement. In conventional houses, 0.75 square foot per bird is needed. Layer and broiler houses should be built so that birds are protected from heat, cold, and bad weather. Most houses today are well-ventilated and well-insulated and have controlled temperature and automatic lights, feeders, and waterers.

## Grooming

Except for horses, most farm livestock are not groomed regularly unless they are show animals. Careful grooming helps keep animals clean, stimulates blood circulation, and reduces the chance of skin disease. A groomer may see cuts and bruises that should be cared for. Clean, well-groomed animals are more comfortable and less likely to spread infections or parasites to other animals.



Grooming a steer for show

# Livestock Diseases and Treatments

Livestock producers must constantly be on guard against disease. A rancher's or stockfarmer's livelihood depends on sound, healthy stock. The producer must be familiar with the diseases, parasites, and disorders that may afflict domestic stock.

Each year, losses from diseases and parasites run into the millions of dollars. Timely measures of prevention and control could probably avert many of these losses. The old saying that "an ounce of prevention is worth a pound of cure" certainly applies to the livestock industry. In the chapter on management practices, you learned about the importance of proper feeding, housing, and sanitation in preventing disease.

This chapter describes a few of the common diseases of livestock and their treatments. Talk with your merit badge counselor, county agent, or veterinarian about the diseases that cause the most trouble in your area. Study the common ones and learn the best treatments. Make a card file or chart and record the most effective treatment for each disease. Describe the treatment (such as the brand name of antibiotic), how much, and how long to treat. Find out what vaccines are given routinely in your area as part of herd or flock health-care programs.

Plan a health program for your stock. Use a calendar to remind you of the best times to vaccinate against disease and to control parasites. Coordinate a year-round health plan with your other management practices. Each time you buy an animal, ask for its vaccination record. Mixing animals can spread diseases. Always try to isolate incoming animals for one month to determine whether they are carrying a disease.

## Diseases of Cattle

The same diseases strike both dairy and beef cattle, so they will be considered together. A few diseases that affect the udder are, of course, most serious in dairy cattle.

The first sign of illness in cattle often is high temperature. Normal temperature is 100.4 to 102.8 degrees Fahrenheit. An animal thermometer inserted into the rectum should be used to take the temperature of cattle. You should get instruction from an expert before trying to take an animal's temperature.



Some of the more common or serious diseases of cattle, and their causes, symptoms, prevention, and treatment, are described below.

### Anaplasmosis

A microorganism that destroys red blood cells, causing anemia and sometimes death, produces anaplasmosis. Symptoms include a slowly rising body temperature, poor appetite, and weight loss. Cattle two years of age or older are the hardest hit; death losses among them may be as high as 50 percent. Pregnant cows afflicted with anaplasmosis often abort. Infected cattle are extremely excitable just before they die, and they may attack their attendants.

The disease is transmitted by insects or dirty needles and dehorning instruments. For prevention, instruments should be disinfected between use on each animal, and insects should be controlled with back rubbers and sprays. A vaccine helps prevent the disease but can be risky. Treatment involves injections of antibiotics by a veterinarian, or the addition of antibiotics to feed.

### Blackleg

Blackleg is caused by a microorganism and is contagious and often fatal. It is seen most often in cattle between six months and two years old. Most outbreaks occur in the warmer months of spring and autumn. The first symptom is lameness, and the upper parts of the leg swell. Temperature usually is high and the animal loses its appetite. Death occurs quickly; a cattle producer might not notice signs of a problem until one or more calves have died.

Vaccination is the only good means of control. All calves four to six months old should be vaccinated, or as recommended by a local veterinarian. Once calves are infected, treatment seldom helps.

### Bloat

Bloat is not actually a disease but an unhealthy condition that causes pain and can kill cattle. It is characterized by abnormal swelling of the left side of the animal. In severe cases, the swelling puts pressure on the diaphragm and lungs and causes the animal to gasp for breath.

Bloat occurs when gas builds up in the first two compartments (rumen and reticulum) of the digestive tract of cattle and other ruminants. The exact cause is not clear, but it is known that legume pastures, alfalfa hay, and high-concentrate

feeds can bring it on. A veterinarian should treat severe cases. Mild cases may be treated by keeping the animal on its feet and walking, or by passing a tube down the esophagus. Puncturing the rumen to let gas escape is a last resort.

As with any disease, prevention is better than treatment. Cattle should be fed dry hay before they're turned out to graze legume pastures.

### Brucellosis (Bang's Disease)

The key sign of brucellosis is a cow that aborts after the fifth month of pregnancy. A microscopic organism is the cause. Testing programs involve checking a blood sample for signs of the organism's presence. All cattle that react positively to the test must be slaughtered to prevent the spread of the disease. Although brucellosis is easily spread from one cow to another, it is not transmitted by marketing the meat or the by-products of an infected animal.

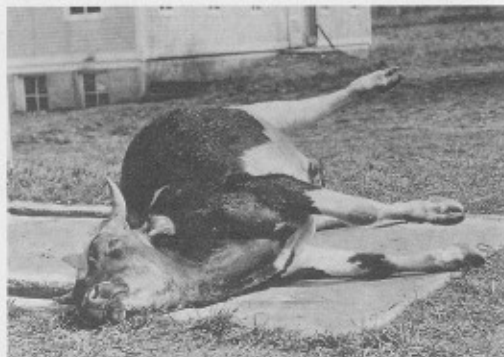
Herd in which brucellosis is suspected are quarantined until they are tested and certified clean. The disease is spread through contact with unpasteurized milk—causing a condition in humans known as *undulant fever*. It's also spread through direct contact with infected cattle or contaminated grass, ground, or water. No known treatments exist; however, a strict government program of eradication that requires carriers of the disease to be destroyed has reduced the incidence of brucellosis from 50 percent of the cattle herds in the United States in the 1930s to less than 2 percent today.

### Calf Scours (White Scours)

Many newborn calves die from calf scours, or diarrhea, in the first 30 days of their lives. Those that recover are often stunted for life. The disease may be caused by bacteria and viruses, and made worse by poor management. High concentrations of cattle, overfeeding, vitamin A deficiency, and parasites may all contribute. Scours kills a calf by causing a loss of water and minerals from the blood and body fluids. Calves pass watery manure and lose weight. If 15 percent of the body weight is lost because of dehydration, the calf goes into a coma and dies.

Treatment includes replacing lost body fluids by drenching through a stomach tube. (*Drenching* is putting a large dose of liquid down the throat of an animal.) Once the specific organism that is causing the disease has been determined, antibiotics may be given by mouth, or injected. Consult a veterinarian before beginning any treatment.

Preventive measures include making sure cows have enough vitamins A and D before calving; and keeping calves in clean quarters, disinfecting stalls, isolating infected calves, and making sure each newborn calf receives a full feed (about 2 quarts) of colostrum milk within one hour after birth. *Colostrum* is special milk that the cow produces during the first three days after calving and that the newborn needs to live. Colostrum milk contains high levels of energy, vitamins, and minerals to get the calf off to a good start, and also supplies antibodies (immunoglobulins) to protect the newborn against infection and disease.



Calf dead of blackleg

## Foot Rot

Foot rot is common in feedlots and corrals or among cattle in muddy, confined areas. The skin between the toes becomes swollen and red and sometimes breaks open. Foot rot can cause deformed hooves and lameness. The disease is caused by an organism in the soil. Cattle stop eating because of the pain and may run a slight fever. Treatment includes trimming affected parts of the hooves and walking cattle through a disinfectant, such as an iodine solution. Prevent foot rot by keeping animals away from wet areas. Also, low levels of antibiotics may be added to the feed.

## Founder

Founder is most common in cattle and horses but may affect most domestic farm animals. The telltale symptom is an inflamed area between the bony part of the foot and the hoof. Lameness, stiff joints, and a painful stiff-legged gait are common signs. Hooves may eventually become deformed and cause cattle to walk strangely.

The usual cause of founder is an animal accidentally getting into feed storage areas and gorging itself on high-concentrate rations such as grain. Keep storeroom doors and feed containers securely locked to keep cattle out. When increasing grain rations to enhance milk production or to fatten cattle, make the increase gradual. Slight increases in the grain ration over two to four weeks should keep animals from foundering.

For treatment of foundered cattle, check with a veterinarian. Some cattle may respond to drug therapy, but for others the most practical treatment may be to sell or slaughter the animals. Once an animal has foundered, the condition generally recurs. Complete cures are rare.

## Grass Tetany

Nervousness and twitching muscles are signs of grass tetany. An afflicted animal may breathe rapidly, stagger, or fall when grazing—the common name of the condition, in fact, is “grass staggers.”

The cause is low blood magnesium due to mineral deficiencies in the soil or forage. A veterinarian can inject a magnesium salt to correct the imbalance. The disease can be prevented by feeding animals a magnesium supplement.

## Ketosis

Ketosis is a nutrition-related disease that can be detected by an odor of ketones on the breath and sometimes in the milk. The odor is similar to that of fingernail polish remover, but much stronger and more offensive. The early symptoms are declining appetite and milk production over two to four days, rapid weight loss, and constipation but normal temperature, pulse, and breathing rate. Milk production drops drastically, and animals may die. Although ketosis affects all domestic farm animals, it is more common and of greatest economic threat in dairy cattle.

Another form of the disease is characterized by mild staggering, partial blindness, walking in circles, poor appetite, drooling, and chewing on nothing.

Only veterinarians should try to treat ketosis. It is a metabolic disturbance, which means it involves the body's chemistry. It may be brought on by high milk production that overtaxes the cow's ability to digest feed and convert it to milk.

## Leptospirosis

Leptospirosis affects the kidneys and may bring on a variety of conditions, including abortion, mastitis (an infection in the udder), high temperature, jaundice, wine-colored urine, and anemia. Although very young animals commonly die from the disease, older cattle may survive.

The cause is a microorganism, and the disease can be diagnosed only through laboratory testing. Vaccinations are recommended for all cattle herds. Deer carry the disease and may infect cattle if herds are not immunized. Leptospirosis is transmitted mainly through water and can affect people as well as cattle and deer.

## Lumpy Jaw

Lumpy jaw causes a hard swelling of the bony tissue about the head, usually the jaw. It may also affect the tissues of the throat, causing “wooden tongue.” Bones become infected, and swelling may break through the skin, discharging pus and a sticky fluid.

Although treatment with antibiotics can cure the disease, cattle usually remain disfigured. Prevention is important. Don't feed rough, coarse feeds that could injure the lining of the cows' mouths when they chew. Sharp objects in feeds such as the bristles of wheat and barley heads, trash, and wire can puncture the mouth lining and lead to infection. Cull afflicted animals from the herd.

## Malignant Edema

Malignant edema has symptoms similar to those of blackleg, but it affects cattle of any age and usually follows an injury. The microorganism that causes the disease enters the body through cuts and scratches. Surgery, difficult births, castrations, infections of the navel, infestations of parasites, and even vaccinations can allow the organism to get in. The best prevention is to keep farm and ranch facilities clean. The organism lives in the soil and tends to build up where cattle are concentrated. An effective vaccine exists to prevent malignant edema. Treatment calls for large doses of antibiotics.

## Mastitis

Mastitis, which may be caused by a microorganism or by an injury to the udder, causes milk to become lumpy and sometimes streaked with blood, and may cause the udder to become hot and hard. Milk production drops.

Treatment involves injecting antibiotics directly into the udder to knock out the infecting organism. On dairy farms, milking parlors must be properly sanitized. Milk from infected and treated cows cannot be used by humans.

A routine mastitis test done at least once a month will detect the disease before symptoms become apparent. To prevent mastitis, keep milking machines well-maintained and take care during milking to prevent injury to the udder. Cleanliness is essential.

### **Milk Fever**

Milk fever is a nutritionally related condition brought on by a calcium deficiency. It may occur at or shortly after calving. The cow is weak and wild-eyed, and often loses consciousness. Her body temperature will generally be below normal. A veterinarian can treat the condition, often by injecting a calcium salt. Treated animals usually recover, but untreated cows are likely to die.

### **Pinkeye**

A cow with pinkeye is sensitive to bright light, is teary eyed, and shows a reddening of the eye membranes. A milky film may cover the eyeballs, and an affected animal may be blinded. Although the condition seldom kills cattle, it is economically serious because of the weight loss and decreased milk production that result from it. Pinkeye spreads rapidly in a herd and is almost always linked to fly infestations.

Microorganisms, combined with the irritation caused by bright sunlight, dust, wind, flies, and weed seeds, are among the factors thought to cause the disease. Those breeds of cattle with white faces, white around the eyes, or light-colored eyes stand a higher chance of getting pinkeye.

Vaccines are not highly effective. A veterinarian may recommend vitamin A injections to help prevent the disease. Management practices that can reduce the problem include controlling insects and dust and clipping pastures to reduce weed-seed irritation. Treatment is difficult and may involve eye drops, sprays, and ointments.

### **Pneumonia**

Labored breathing, wheezing, a nasal discharge, an extended tongue, and a wide-legged stance may be signs of pneumonia. Cold weather and exposure to a virus, improper drenching that allows water vapors to be inhaled into the lungs, and inhaled dust or chemicals are among the causes. When drenching, hold the head in a normal, level position—not high in the air.

Antibiotics are the common treatment for pneumonia. Afflicted animals may be isolated and kept from stressful situations. With veterinary care, affected animals may have a death rate of less than 20 percent. For untreated animals, the death rate may be as high as 75 percent.

### **Red Water Disease**

Red water disease is fatal and usually occurs in the spring. Animals with the disease will pass blood-tinged urine that is dark red in color. Other symptoms include labored breathing and grunting, an arched back (a sign in animals of abdominal pain), a weak and rapid pulse, high fever, and a swollen brisket (breast). Death usually comes within 12 hours from the time signs first appear. The disease is caused by a microorganism.

Treatment for red water disease oftentimes is not successful. Prevention is a must. A vaccine is available for herds in high-risk areas. The disease may be spread by flooding from an infected field to a clean area, and by snails. Good drainage of pastures is important.

### **Shipping Fever**

Shipping fever may occur after a calf has been castrated, vaccinated, dehorned, or weaned; perhaps after it has been chilled or wet; or especially if it has been shipped a long way to a new location. Although stress may bring on the illness, the actual cause of the disease is any of a variety of microorganisms. Symptoms include fever of 104 to 106 degrees Fahrenheit, not eating, difficulty breathing, coughing, runny eyes and nose, and diarrhea.

Antibiotics and vitamin injections are useful in treatment. Because stress is the major factor contributing to this disease, it's a good idea to avoid doing all of the jobs of weaning, dehorning, castrating, and vaccinating at one time. Cattle should be worked gently over a period of time. As a precaution, cattle can be vaccinated for shipping fever before they're shipped.

### **Diseases of Horses**

A healthy horse always wants to eat; a poor appetite or a refusal to eat is one of the first signs of illness. A rectal temperature check that shows a temperature above or below the average range of 99 to 100.8 degrees Fahrenheit (100.5 degrees average) will confirm the presence of a problem. Temperature is taken with a rectal thermometer. You should get instruction from an expert before trying to take a horse's temperature.

Horse owners can help prevent disease by keeping stables and horses clean. Clean feed boxes and change bedding regularly. Call a qualified veterinarian when a horse shows signs of illness. Some common diseases, injuries, and parasites of horses are described below.

### **Colic**

A painful digestive problem, colic may be brought on by a horse's overeating, drinking too much water while hot, or eating moldy feeds. The intestine is blocked or impacted, causing the horse much pain. A horse with colic will be greatly agitated, constantly moving, sweating, and trying to roll. Rolling may lead to a twisted gut,



which is fatal. An afflicted horse should be haltered to prevent rolling, and walked until a veterinarian arrives. The veterinarian may give mineral oils by stomach tube to relieve the compaction in the intestine.

### **Fistula Withers**

Bruises from poorly fitted saddles or headgear may create sore places on the poll or withers that may become infected. Isolate horses with ruptured, draining sores to prevent the possible spread of infection. Afflicted horses should be under the care of a veterinarian.

### **Founder**

This is a painful lameness in the front feet, and sometimes all four feet. Founder may be caused by overeating, a drastic change in the diet, a lack of exercise, or drinking cold water when overheated. The horse can get some relief from the pain by standing in mud puddles or cold water. A veterinarian, if called in time, may be able to treat the condition with drug injections, but in many cases the damage to the hooves is permanent and the only treatment is by special shoeing.

### **Heaves**

A horse may be allergic to dusty or moldy feed, which causes the animal to cough and wheeze. The condition may be hereditary. Feeding clean forage sprinkled with a little water or feeding pelleted rations may help prevent the heaves.

### **Horse Bots**

The bot fly lays eggs on the leg hairs of a horse. By licking affected areas, the horse can pick up eggs and larvae in its mouth. From the mouth, the larvae migrate to the stomach. Eventually, they pass out in the horse's droppings, pupate in the soil, and emerge in the spring as flies ready to lay eggs. A horse infested with bots may have frequent digestive problems, colic, anemia, and a lack of energy. Removing eggs through good grooming will help prevent the problem. A veterinarian can treat for heavy infestations by giving medication through a stomach tube.

### **Influenza**

Influenza is a respiratory disease much like the flu in humans. Symptoms include coughing, nasal discharge, and high fever. A veterinarian may prescribe antibiotics and complete rest. Equine influenza is caused by eight different viruses, and vaccines that will create immunity are available for some of them.

### **Monday Morning Disease**

Horses that are fed as much on days that they're idle as when they're working may come up lame when work resumes after a weekend break. Tight muscles, stiff legs, and heavy sweating are some of the signs of this problem. To prevent this condition, feed a horse less when it's not working.

A horse with Monday morning disease should be rested immediately in a standing position as soon as the rider realizes there is a problem. Do not move the horse. It may be necessary to provide the animal with temporary shelter where it stands. Call a veterinarian at once to prescribe treatment.

### **Sleeping Sickness (Equine Encephalomyelitis)**

A horse with sleeping sickness may stumble, fall, or stand with its head hanging. It may have a drowsy appearance, and may fall asleep even while eating. The disease can cause complete paralysis, and death. The cause is a virus transmitted by mosquitoes and flies. Once afflicted, animals either die or develop immunity. An annual vaccination program is highly recommended and is mandatory in most states.



**A collapsed colt suffering from equine encephalomyelitis (sleeping sickness).**

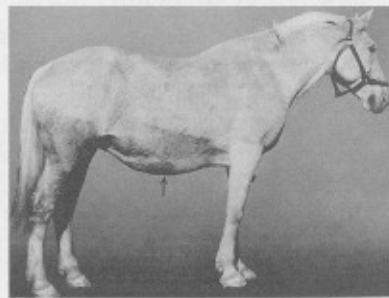
### **Strangles (Equine Distemper)**

Strangles may strike horses between six months and five years of age. It is caused by a microorganism and is contagious. High fever, coughing, discharge of pus from the nose, and swelling of glands under the jaw are symptoms of strangles. Eventually, the glands break open and discharge pus. Isolate an afflicted horse in a clean, well-ventilated stall; allow it to rest; and treat it with antibiotics. The disease is seldom fatal, and once a horse has recovered, it usually is immune from further attacks.

### **Swamp Fever (Infectious Equine Anemia)**

The virus that causes swamp fever is carried by flies and mosquitoes. Symptoms are high fever, labored breathing, pounding heart-beat, and exhaustion. Most afflicted horses die within 30 days; those that recover are immune from further attacks. There is no cure, but the disease may be controlled by keeping horses out of low places and by properly draining land.

A horse that has had swamp fever but has recovered, although itself immune, can spread the disease. Carriers can be identified by the Coggins test. A negative Coggins test certificate is required at most of the larger horse shows and race tracks as a part of an animal's health papers.



**Swellings on the abdomen can indicate swamp fever.**



## Tendinitis

Swollen tendons in the legs mark tendinitis, which is an extremely painful condition. It is caused by a severe strain as a result of accident, intensive training, muscle fatigue at the end of long races, muddy tracks, improper shoeing, and even defective conformation in the horse itself, such as a horse that has long, weak pasterns or is too big for its foot structure.

A horse with tendinitis (bowed tendon) will pull up lame, holding the heel up to relieve the pressure and pain. The injured leg will be hot and swollen. A veterinarian may use drug injections, a cast, and bandages to treat the injury. Once the cast and bandages are off, the horse must be rested for at least a year for the injury to heal completely.

## Tetanus (Lockjaw)

Puncture wounds may be infected by the tetanus organism, which produces a poison 100 times more powerful than strychnine and causes muscle contractions. Stiff legs, noise sensitivity, and folding of the inner eyelid over the eye are the symptoms of a horse with lockjaw. Death may occur within 24 hours. Treatment usually is ineffective. A vaccine will prevent the disease.

## Worms

Infestations of roundworms, stomach worms, and bloodworms can lead to poor growth, anemia, a dull coat, listlessness, and digestive problems, including colic. Gathering manure from stables or pastures and frequently rotating pastures can help reduce infestations, but good management requires that all horses be dewormed routinely once or twice a year.

## Diseases of Sheep

Sheep should be treated gently at all times, and especially when they are ill. Ill or injured sheep can easily slip into shock, followed by death.

As with other classes of livestock, body temperature often is the first sign of disease in sheep. The normal temperature range is from 100.9 to 103.8 degrees Fahrenheit, with an average of 102.3 degrees.

For blackleg, bloat, foot rot, founder, grass tetany, and pinkeye, the signs, treatments, and prevention are the same as for cattle. Bluebag in sheep is the same disease as mastitis in cattle. Other common diseases of sheep are described below.

## Bluetongue

Symptoms of bluetongue are depressed appetite, an inflamed nose and mouth lining that may turn blue, frothing at the mouth, and labored breathing. A red band may appear at the top of the hoof. Bluetongue is of the most concern to sheep ranchers in the southwestern United States. It is caused by a virus transmitted by insects. Treatment is seldom effective. A vaccine is recommended for prevention.

## Circling Disease (Encephalitis)

An animal afflicted with encephalitis walks in circles, staggers, and may be paralyzed. The disease usually is fatal. It is caused by a bacterial infection of the brain. There is no prevention other than good sanitation.

## Enterotoxemia (Overeating Disease)

Enterotoxemia is a serious problem in feedlots. A high level of concentrate feeding can bring on a condition afflicting feedlot lambs with staggering and convulsions, which may lead to death. Toxins produced by bacteria in the digestive tract cause enterotoxemia. Antitoxins given by a veterinarian can be effective. Vaccines for prevention are available.

## Lamb Dysentery (Scours)

Good sanitation and well-protected, dry shelters are important in preventing lamb dysentery, which can cause high death losses among lambs during the first few days after birth. Diarrhea and fever are the principal symptoms. The cause is a microorganism. Lamb dysentery usually is a problem where sheep are in close confinement, seldom on open range.

## Pregnancy Disease

This is the same disorder as ketosis in cattle. Ewes may show signs of the disease during the last two weeks of pregnancy, including trembling when exercised, weakness, and collapse. Feeding a high-energy feed such as molasses can help prevent or treat the disorder.

## Scrapie

Sheep with scrapie will scrape off wool by rubbing against fences and other objects because of the unbearable itching. Animals with scrapie usually will have no fever but will walk with an unsteady, uncoordinated gait. Paralysis and death follow. A virus causes scrapie, and no treatment is known. To prevent the spread of this highly fatal disease, government regulations often require that infected flocks be destroyed.

## Soremouth (Contagious Ecthyma)

This highly contagious disease usually strikes lambs but may also affect humans. Small blisters appear on the mouth, nose, lips, and tongue. Pus drains from infected areas. Death losses are low, but because the lambs fail to eat and gain weight, this is a serious condition economically. The cause is a virus. Afflicted lambs should be isolated until sores heal. Vaccines are available for prevention.



Taking blood samples for test purposes

### Stiff Lamb Disease (White Muscle Disease)

Still lamb disease is nutritionally related and usually affects only lambs younger than one month old. Early symptoms are stiff rear legs and a humped back. A selenium or vitamin E deficiency causes the condition. Injecting these substances is a useful treatment. Adding linseed meal, which contains vitamin E, to the feed may prevent the condition.

### Tetanus (Lockjaw)

Sheep may get tetanus after shearing, docking, castration, and even vaccination. Stiffness, muscle spasms, rigidity, and convulsions are the usual signs, followed by death. Treatment is seldom effective. Tetanus can be avoided with good management. Vaccinations are available and should be given well before docking, castration, and shearing.

### Wool Maggots, Ticks, Mites

Wool maggots are the larvae of certain kinds of blowflies. Commercial sprays and dips are available to control them. Regular dipping will control ticks and also mites, which cause mange or sheep scab.

### Worms

Although worm infestations seldom kill sheep, they slow growth and cause unthriftiness. Signs of a worm problem are pale eyelids (indicating anemia), poor growth, potbelly, and swellings under the jaw. Veterinarians can prescribe many effective stomach drenches and drugs.



Spraying sheep for lice

### Diseases of Goats

Soremouth is a highly contagious disease that causes sores on the mouths of goats. Caprine arthritic encephalitis (CAE) is a virus that causes arthritis in goats, can cause paralysis in goat kids, and may reduce milk production in does. Some three-quarters of goats tested in the United States have CAE, although many show no symptoms. Check with a veterinarian for tips on prevention and treatment.

Most goat keepers vaccinate their herds against two serious diseases—tetanus, which affects the muscles, and enterotoxemia, which affects the intestines. Goats should receive selenium shots in areas where this mineral is lacking. Worms are often a problem in goat herds, so regular deworming is usually necessary.

### Diseases of Swine

Good sanitation of buildings and equipment and a planned immunization program will go a long way toward keeping a swine herd free of disease and parasites. Sanitation is extremely important in swine management because hogs usually are kept in close confinement.

The normal rectal temperature of swine is 102 to 103.6 degrees Fahrenheit, with an average of 102.6 degrees. As with other livestock, any deviation from the normal temperature could be a sign of illness. Some common illnesses and parasites of hogs are described below.

### Anemia

Anemia results from an iron deficiency and is most common among hogs in confinement. Hogs kept outdoors are able to root around in the soil and pick up the needed iron. Anemia is particularly a problem of rapidly growing piglets. Sow's milk supplies only a fraction of a baby pig's daily iron requirement. Symptoms of a deficiency include rough hair coat, listlessness, and pale eye and mouth membranes. In the advanced stages, labored breathing and rapid heartbeat also appear.

An effective treatment for anemia is to inject iron preparations. Providing fresh soil for pigs to root around in and swabbing the sow's udder with an iron sulfate solution may also be effective. Injecting baby pigs at one to three days of age with an iron solution may easily prevent the condition.

### Atrophic Rhinitis

Atrophic rhinitis first appears when a pig is less than three weeks of age and gets worse as the pig grows older. Early symptoms include sneezing, coughing, and snorting. At four to eight weeks of age, the snout of an infected pig begins to wrinkle. By the time the pig is four months old, the snout and face may be twisted to one side. Afflicted pigs are slow to gain weight and sometimes die of pneumonia. Bacteria cause the problem, and dust and other irritants contribute to it.

A veterinarian may recommend medicated feed and water and treatment of pregnant sows to control the bacteria. But prevention is the best course. All animals should be purchased from a source free of the disease and kept in clean, well-ventilated swine houses. Vaccines are available to protect pigs and adult animals.

### Brucellosis

This is similar to brucellosis in cattle but is caused by different bacteria. The disease causes sows to abort. There is no treatment—infected animals must be slaughtered. To prevent the spread of brucellosis, herds should be tested annually and hogs that carry it destroyed.

## **Cholera**

Hog cholera is among the most serious diseases of swine. It is highly contagious. The usual symptoms are lack of appetite, high temperature, diarrhea, and weight loss. There may be discharge from the eyes. Afflicted animals suffer dehydration and drink much water. They may walk with a wobbly gait. A virus causes the disease, and there is no treatment. Infected herds are quarantined and slaughtered.

## **Dysentery**

Dysentery is contagious and can cause severe economic losses. Affected animals go off their feed. Their feces may look like wet cement or milky coffee. The stool is streaked with blood in the later stages of the disease. Bacteria are believed to cause swine dysentery. Carriers may include pigs, birds, dogs, humans, and dirty equipment.

Medicated water and feed can be used to control the disease. Keeping floors clean and dry, giving uncontaminated feed and water, and eliminating stress factors such as overcrowding, chilling, and poor ventilation will help prevent outbreaks of swine dysentery.

## **Erysipelas**

Pigs with the acute form of swine erysipelas may have fever, lose their appetite, develop sore muscles or tender feet, have an arched back, and walk with a shuffling gait or remain lying down. Red patches may appear on the skin. Some pigs may die suddenly. Pigs affected with the chronic form may suffer from arthritis and swollen joints, and the tips of their tail or ears may blacken and fall off.

The disease is caused by bacteria and may be treated with antibiotics. A swine erysipelas antiserum and vaccines are available. To help in prevention, control rats and flies, which can carry the bacteria, and burn dead pigs.

## **Leptospirosis**

Leptospirosis causes abortions or stillbirths, or small, weak pigs at farrowing (birth). It is caused by several microorganisms that may contaminate feed, water, and pastures. Cattle, rats, and other animals are carriers of the organisms and may spread the disease. Antibiotics are effective in treatment. Vaccines are available for prevention. Swine producers should isolate any new animals and test them for "lepto" before allowing them to join the herd.



## **Mycoplasma Pneumonia**

A dry, rasping, persistent cough is the most common sign of mycoplasma pneumonia, which is caused by bacteria. Affected pigs grow slowly. Although the original infection is mild, secondary infections can cause severe losses. Antibiotics may be used to treat the secondary infections. Swine producers should stock herds from sources free of this disease.

## **Pseudorabies (Mad Itch)**

Baby pigs with pseudorabies suffer high temperatures, convulsions, and paralysis, and usually die. Adult hogs may show no signs, or they may have respiratory problems, poor appetite, and infertility, and litters may be aborted or stillborn. Although adults seldom die, they carry the disease after they have recovered. The cause is a herpesvirus, which can cause severe itching and lead to self-mutilation—hence the name "mad itch." No treatment is available, but vaccination can prevent the disease.

## **Transmissible Gastroenteritis (TGE)**

An infectious disease that causes many deaths among young pigs, TGE is signaled by poor appetite, vomiting, scours, and weight loss. Afflicted pigs pass whitish, yellowish, or greenish feces and soon die from dehydration. TGE is caused by a virus usually passed through the manure and the respiratory tract of infected swine. There is no effective treatment. Prevention requires strict sanitation, disinfection, and vaccination.

## **Diseases of Chickens**

Modern confinement methods of raising broilers and layers make disease outbreaks particularly serious. The emphasis should be on prevention rather than treatment. Good poultry management stresses sanitation, proper housing, quarantine of sick birds, and immunization.

A bird that eats and drinks little may be sick. Diarrhea, paralysis, breathing difficulties, skin conditions, and bloody or unusually wet droppings are other signs that something is wrong.

A poultry producer with a diseased flock is in trouble. Each year, inspectors reject millions of pounds of poultry for human consumption because of diseased birds. In a laying flock, a 10 percent to 12 percent annual death rate may be expected. The normal annual death loss for broiler flocks is no more than 4 percent. Losses greater than these signal a serious condition that demands prompt attention.

Diagnostic laboratories recognize some 80 separate diseases or parasite problems of poultry. Some of the more common problems are described below.



## Avian Tumor Diseases

Tumors in chickens are caused by viruses. Marek's disease mainly affects young, growing chickens three to five months old. Lymphoid leukosis, another tumor disease, primarily affects chickens older than 18 weeks. Birds with Marek's disease may suffer paralysis of the legs, wings, and neck. Lymphoid leukosis hits laying hens the hardest, causing weight loss, poor condition, and an enlarged liver.

A vaccine to develop immunity in chickens is available for Marek's disease. Where Marek's disease is known to exist, vaccinations must be given on the first day of age. No treatment or preventive vaccine is available for lymphoid leukosis. Infected hens, identified by a blood test, should be eliminated from the flock.

## Chronic Respiratory Disease

Chronic respiratory disease affects the air sacs. The sacs fill with fluid, the lungs harden, and breathing becomes difficult. The death rate may be high. Broilers that recover may be rejected at carcass inspection. Microorganisms cause the disease, and antibiotics are effective in treatment. Isolation of afflicted birds and proper sanitation help prevent the spread of the disease.

## Coccidiosis

Outbreaks of coccidiosis can kill many birds. Affected birds are weak, droopy, and anemic, often showing blood in the droppings. Microorganisms that attack the intestinal tract are the cause. To control or eliminate outbreaks, avoid overcrowding, keep litter dry, and feed rations that contain a preventive medicine.

## Fowl Pox

Birds with fowl pox show black, raised scabs on the comb, wattles, face, shanks, and feet. Egg production drops, growth slows, and egg fertility is reduced. The cause is a virus spread by infected birds and mosquitoes. A vaccine is available to protect against infection. If fowl pox appears in a flock, treatment commonly consists of removing and isolating infected birds at the first sign of illness, and vaccinating the rest of the flock.



Vaccinating for fowl pox

## Hysteria

Birds subjected to loud noises, rapid light changes, or quick movements may panic. Broilers in open houses fly into a corner of the house, and many may suffocate. Caged layers may try to fly and break their wings or necks.

To prevent hysteria, take care not to frighten birds. Some poultry managers play a radio in houses to get the birds used to the sound of human voices and noise. Some knock several times before opening a door to the poultry house to draw the birds' attention so that they won't be startled when the door opens. Although this is a problem of behavior rather than disease, hysteria can be costly.

## Infectious Bronchitis

Coughing, wheezing, and difficult breathing are common signs of infectious bronchitis. Young birds often die, and hens lay fewer eggs. The cause is a microorganism, and there is no treatment once an outbreak occurs. A vaccine can provide control.

## Infectious Bursal Disease

Infectious bursal disease may cause chickens three to six weeks old to develop a whitish diarrhea, become dehydrated, and bleed in their muscles. Death losses may be high; birds that recover are immune to future attacks. The cause is a virus. Vaccines are available to protect birds against infection.

## Infectious Coryza

Infectious coryza is similar to the common cold in humans. Signs include discharges from the nostrils and eyes. Infected birds can be treated with drugs. However, prevention is the wisest course—by isolating affected birds, disposing of old hens at the end of the year, and rearing chicks in a controlled, clean environment.

## Infectious Synovitis

Broilers four to 12 weeks old are the usual victims of infectious synovitis. The hock joints and foot pads swell with a condition similar to arthritis, making many birds lame and slowing their growth. The cause is a microorganism that invades the joints. Treatment generally is ineffective, but antibiotics added to the feed may control infections and prevent the disease from spreading.

## Newcastle Disease

Death losses can be high among broilers with Newcastle disease, and a laying flock that has it can fail to produce eggs. Symptoms include difficult breathing, rattling, coughing, and sneezing. The disease can be controlled with vaccines.



## Parasites

Infestations of lice and mites can hurt the production and overall health of birds. Pesticides approved for use on poultry are available to control these parasites. Roosts and houses should be treated, as well as the birds themselves.

Worms that live in a bird's digestive system and intestinal tract may cause lowered production, an unhealthy appearance, anemia, and listlessness. Sanitation is essential for control of these parasites. Keep litter and houses clean. If an infestation occurs, commercial drugs are available for deworming birds. Antibiotics may be used at low levels in the feed for protection from some kinds of worms.

## Salmonellosis

Salmonella bacteria attack many animals, including humans, and can be a serious health threat. In chickens, these organisms cause pullorum disease and fowl typhoid. Baby chicks with pullorum huddle together, lose their appetites, may show labored breathing, and often develop a whitish diarrhea. Although they do not show signs of it, adult birds that have recovered from pullorum carry the disease and may lay infected eggs.

A poultry manager who suspects pullorum will commonly fumigate the incubator and eggs. Strict sanitation is important. Infected breeder birds should be eliminated from the flock.

Fowl typhoid, another salmonella-induced disease, has signs similar to those of pullorum. Good hatchery sanitation and elimination of infected birds are the recommended control methods.

# Production Notes

When livestock producers speak of production, they're talking about an animal's growth, fattening, milk or egg production, reproduction, or work. All the aspects of animal science that have been described in this pamphlet contribute to production. By choosing stock carefully; by managing the herd or flock properly to ensure that the animals have adequate food, water, shelter, and exercise; and by attending to the health-care needs of their animals, livestock producers can enhance their stock's productive ability.

This chapter presents a few production guidelines to help you judge how well a herd or flock is doing. These are general goals. To get a better understanding of the level of production to be expected in your area, talk with your merit badge counselor, a local livestock producer, or your county agent.

## Estrous Cycles and Pregnancy

Knowing the fertility cycles of animals and the length of pregnancy is basic to being able to judge an animal's productive potential.

**Table 7. Length of Estrous Cycle and Pregnancy in Farm Animals**

Animal	Length of Estrous Cycle (Heat Period)	Length of Pregnancy
Cow	21 days	282 days
Sow	20-21 days	114 days
Ewe	16-17 days	150 days
Goat	19-20 days	150 days
Mare	19-23 days	336 days

## Cattle Performance

Traits of high economic value in cattle include reproductive efficiency, mothering ability, rate of gain, economy of gain, longevity, and carcass merit. Individual animals differ in their performance and in their ability to pass these desirable traits to their offspring.

High-producing females are fertile and have a record of regular pregnancies, live births, and good milk production. Males should show masculinity, aggressiveness, and high fertility. Their offspring should be able to make efficient use of feed to gain weight rapidly. Growth from birth to weaning is largely a reflection of the cow's milk production and the calf's inherited ability to gain. Provided that animals are fed properly and their health and other needs are seen to, a young animal's inherited traits are the major factors determining the quality of the end product: a long-lived, high-producing addition to a breeding herd, or a market animal that will yield a high percentage of quality beef.

## Fattening Cattle

Cattle may be grown over the winter on roughage. Calves weighing about 400 pounds purchased in October or November are wintered to gain about 1.5 pounds per day. Market cattle gaining at this moderate pace will gain efficiently once they are fed high-concentrate rations. They are then fattened to their best weight, or *finished*, on some combination of a roughage and a high level of grain.

Cattle are finished quickly in a feedlot. Cattle weighing 750 pounds can be finished in 150 days or fewer in a feedlot, where they are on a full-feed program with high-concentrate rations. The feed conversion under this system will be about 7 pounds of feed per pound of gain, with an average daily gain of 2.5 pounds or better.

Where available, wheat, rye grass, barley, and oats pastures, and mixtures of these with clovers, can be effective in producing gains cheaply with little or no supplemental feeding. Cattle are purchased in the early fall and grazed through the winter. Then they may go directly into the feedlot for full-feed rations, or they may be grazed through summer pastures to take advantage of more low-cost gains before entering the feedlot in the fall.



**Reproductive efficiency and mothering ability are two traits in cattle that contribute to high economic value.**

## Carcass Grading

Beef carcass grades are based on the quality of the meat (USDA quality grades) and the quantity or yield of trimmed, boneless, major retail cuts of beef (USDA yield grades). Both grades are assigned to a beef carcass.

USDA quality grades are prime, choice, good, standard, commercial, utility, cutter, and canner. USDA yield grades are expressed by a number, 1 through 5, with yield grade 1 having the highest yield of retail cuts, and yield grade 5 the lowest.

## Performance Characteristics

Several factors besides just weight are considered when farm animals are judged for their economic value. Some economically important traits of livestock include the following.

**Carcass Merit.** The fineness of a dressed meat animal, based on the *quality* of the meat (its taste, tenderness, and "eating" characteristics) and on the *yield* (the percentage of lean meat obtained from the carcass).

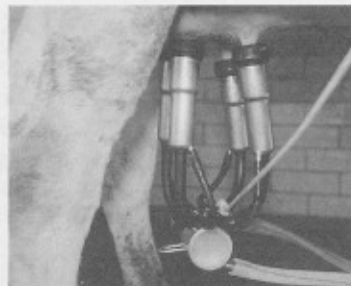
**Feed Efficiency (or Feed Conversion).** The number of pounds of feed needed to produce 1 pound of weight gain or product. For example, it takes about 9 pounds of feed to produce 1 pound of on-foot beef, 4 pounds of feed to produce a pound of pork, but only 1.11 pounds of feed to produce 1 pound of milk.

**Fertility (Reproductive Efficiency).** An animal's ability to reproduce regularly, to produce vigorous, fast-growing offspring, and to produce (in the case of sheep) twins or (in the case of litter-bearing animals such as swine) large litters.

**Longevity.** How long the animal lives and can reproduce.

**Mothering and Nursing Ability.** A breeding female's ability to feed, protect, and care for her young. The survival of young animals from birth to weaning and how heavy they are when they are weaned depend largely on the mother's maternal and milking abilities.

**Rate of Gain.** How quickly the animal gains weight. *Rate of gain* and *economy of gain* in meat animals are related. For example, some cattle may gain only 1 pound a day, while others (in the same feedlot and on the same ration) may gain more than 3 pounds daily. Those that put on weight the fastest also show the most economical gains: Rapid growth is efficient growth.



## The Milking Herd

A modern dairy cow commonly produces 15,000 to 25,000 pounds of milk in a year. Many top cows produce more than 40,000 pounds of milk per year.

A dairy cow normally will produce milk for 305 days, with a 60-day dry period. This may vary from a 270-day milking period or less, to a lactation of more than 400 days. Shorter periods normally are caused by the cow being bred back soon after calving, or she may be dried up because of illness. Longer periods are mainly due to problems in getting the cow bred.

Milk production is fairly high immediately after calving and increases until the cow reaches her maximum production. Daily lactation peaks 45 to 60 days after calving. Then the amount of milk produced declines gradually until the cow is dried up, to give her time to prepare to deliver her next calf.

It is virtually impossible for a high-producing dairy cow to eat enough to satisfy her energy needs during the peak of her lactation period. As a result, a good dairy cow is expected to lose weight during peak production. This weight is replaced later in the lactation period.

## Horse Performance

There is a direct relationship between a horse's *conformation* (build) and its type, and the work it is to do. A working horse must be built for the job it's to do. A quarter horse, for example, should have a well-balanced, well-muscled body, firmly supported by strong, straight legs. A quarter horse viewed from the side should have a short back and long underline. This gives the horse the ability to stretch out underneath. It should have short, erect ears that often point forward. This indicates

a horse that is in good condition, alert, and paying attention to its surroundings—essential qualities in a cutting horse, roping horse, or stock horse. The eyes should be prominent and set well apart so that the horse can see forward and backward without moving its head. This allows the horse to react quickly. The nostrils should be large to allow the intake of air necessary for a hard-working horse (horses do not breathe through the mouth).

The points of conformation judged ideal for the various breeds of horses are beyond the scope of this pamphlet, but the interested Scout may write or call the appropriate breed association to find out about a specific breed. (See the "Resources" section.) Most associations have a list of standards available at no cost.



**A cutting horse must be in good condition, alert, and paying attention to its surroundings.**

## Sheep Performance

Ewes of most sheep breeds can conceive (become pregnant) only during the fall. Unlike cattle that can be managed to calve in the spring, the fall, or all year round, sheep normally lamb in the spring. A few breeds do not follow this general pattern and may produce out-of-season lambs. The Dorset is an example.

Feeding extra grain or grazing ewes on lush pasture two or three weeks before the breeding season is recommended to make ewes more fertile and increase the chances of twins being conceived. A 110 to 150 percent lamb crop in a flock is desirable. Feeding  $\frac{1}{2}$  pound of oats or corn per head per day in the weeks before the breeding season may produce an increase in the lamb crop of 10 to 20 percent.

The birth weight of lambs, how often ewes have lambs, how often they have twins, the weaning weight, weight gain, feed efficiency, fleece weight, and carcass merit are the points of major interest to sheep producers. Producers judge individual animals according to their abilities in these categories and cull from the flock the animals that fall short.



**Most ewes can conceive only during the fall and lamb in the spring.**



## Meat and Wool

Sheep produce two major products: meat and wool. In meat-type breeds, the emphasis is on carcass traits, and wool generally is a minor consideration. Sheep destined for slaughter should be well-muscled. With sheep kept for wool production, however, producers place less emphasis on body conformation and pay more attention to the weight and quality of the fleece. As a rule, wool-type sheep are larger, more angular, and less muscular but have heavier fleeces than meat breeds.

The carcass of a slaughtered sheep is classified as *lamb* for a young animal or *mutton* for a mature animal. A carcass will generally yield from 46 to 53 percent meat. The rest of the carcass produces by-products such as glue, soap, and fertilizer. One by-product, chamois skins, is unique to sheep. Cleaned of wool and tanned, sheepskins were once used for college diplomas. Now, chamois skins are most likely to be seen in gas stations and car washes.

Sheep are sheared for wool when the weather begins to turn warm, usually from March to July. Shearers on most sheep farms and ranches use electric clippers and take care to remove the fleece in one piece, as if it were a blanket being unwrapped from the animal. Shearing is a skill that can be learned only through practice. If you want to learn, check into the possibility of attending a sheepshearing school or training with professional shearers.

The American or "blood" system of grading wool is based on comparing the quality with that of Merino wool. The grades are *fine* (for full-blooded Merino), *half blood*, *three-eighths blood*, *quarter blood*, *low quarter blood*, *common*, and *braid*.

## Dairy Goat Performance

Good dairy goats can produce up to 3 to 8 quarts of milk a day, averaging about 2 quarts a day over 10 months. Does should be milked two times a day on a regular schedule.

The mating season of a goat depends on where it lives. In tropical areas near the equator, goats mate throughout the year, whereas in the temperate regions, they breed only from late summer to late winter. They begin breeding as the days grow shorter. A doe gives birth to two or three kids about five months after mating.

## Hog Production

Litter size and weight at birth, litter size and weight at weaning, conformation, rate and efficiency of weight gain, and net carcass value are the characteristics that determine swine productivity. Sows have large litters at short intervals, making it possible to market large numbers of animals. An outstanding sow can produce more than two litters of 10 market pigs, or nearly 5,000 pounds of pigs for market, per year.

The usual litter size is eight or nine piglets. Gilts (young female hogs) usually are bred when they are eight months old or on their third heat period, which allows them to farrow (give birth) at about one year of age.



**Sows have large litters at short intervals, sometimes producing more than two litters of 10 market pigs each year.**

Swine are fed according to age and purpose. A pregnant sow is fed a special gestation ration containing 12 to 14 percent protein. From farrowing to weaning, the sow gets a lactation ration with 16 percent protein. Weaned piglets receive premixed rations as described under "Feeding Hogs" in the chapter on management practices. Market hogs are classified and sold in four market classes based on sex, the use to which the animal is best suited, and weight.

- Most finished market hogs are *barrows* and *gilts*—castrated male hogs and young females. They reach market weight at 200 to 250 pounds. Most pork for human consumption comes from this market class.
- *Sows*, usually weighing upward of 220 pounds, make up the second market class of swine. Pork from sows marketed for human consumption is mainly in the form of cured pork.
- *Stags* (castrated males that show some sexual development) and *boars* (intact males) are low in market value because little of the carcass is suitable for human consumption. Lubricants, fertilizers, hides, and other by-products are the main uses of these classes.

Carcass grades indicate the quality of an animal in its specific market class. The U.S. carcass grades are U.S. No. 1, U.S. No. 2, U.S. No. 3, U.S. No. 4, and Utility. These grades are determined by inspecting the fat and the lean for quality, including firmness, color, backfat thickness, belly fatness, and loin marbling, and by the percentage of the four major wholesale cuts—hams, loins, picnics, and Boston butts. U.S. No. 1 carcasses have a high-quality lean, a high yield of lean cuts, and a low percentage of backfat. The poorest quality carcasses—those with unacceptable belly thickness and those that are soft or oily—are graded U.S. Utility.



## Poultry Production

Commercial high-laying hens will produce 20 eggs a month. Layers are seldom kept for more than 19 months because production begins to drop by this age. Eggs should be collected frequently, cleaned immediately, and refrigerated. With good management, it should take less than 4½ pounds of feed to produce a dozen eggs.

Eggs are graded according to weight and quality for three markets.

- **Consumer grades**—Grade AA or Fresh Fancy, Grade A, and Grade B; and Jumbo, Extra Large, Large, Medium, Small, and Peewee
- **Wholesale grades**—U.S. Specials, U.S. Extras, U.S. Standards, U.S. Trades, U.S. Dirties, and U.S. Checks (used in wholesale trade; may be re-sorted to conform to consumer grades)
- **U.S. procurement grades**—Special designations for institutions and the armed forces



Commercial high-laying hens will produce 20 eggs a month.

## Broilers

A broiler should weigh about 5½ pounds at 50 days of age. Feed conversion should average 2 pounds of feed or less per pound of gain.

The U.S. Department of Agriculture has established the following grades for broilers (fryers). The grades are based on conformation, fleshing, fat covering, and presence or absence of defects.

Live birds	Dressed birds
A or No. 1 Quality	U.S. Grade A
B or No. 2 Quality	U.S. Grade B
C or No. 3 Quality	U.S. Grade C

Other classes of chicken meat include the *roaster*, a young chicken more mature than is acceptable for broilers; *capon*, a castrated male younger than eight months of age; *stag*, a male chicken younger than 10 months but showing developing sex characteristics; *cock* or *rooster*, a mature male; and *hen* or *stewing chicken*, a mature hen, usually older than 10 months, often culled from laying operations. The Rock Cornish or Cornish game hen is a five- to seven-week-old immature female weighing no more than 2 pounds ready to cook, selected from Cornish or Cornish-cross matings. These are popular at convention banquets and similar affairs.

# Careers in Animal Science

Few professions are more basic to American society than that of agricultural producer. Farmers and ranchers grow the crops and raise the livestock that provide the food we eat and the natural fibers we need for clothing and other items.

Agricultural producers are the first link in the vast chain that includes the raising, processing, transporting, and marketing of food and fiber. The whole chain is called *agribusiness*—this nation's largest industry.

American farmers and ranchers are the most productive agricultural workers in the world. They produce enough food and fiber to meet the needs of Americans and to export vast quantities to countries around the world.

People who are interested in animal science may pursue a career in livestock production or in numerous related fields in agribusiness, research, education, or veterinary medicine. The stockraiser's way of life is challenging, satisfying, and personally rewarding, but advances in agricultural production have meant that fewer people actually are needed on farms and ranches. Today, each on-farm worker is many times more productive than in years past. One hundred years ago, a farmer produced enough food and fiber for five people. Now, each farm worker supplies enough for more than 100 people. Total agricultural output has more than doubled in the past 50 years, although the amount of land used for agriculture has declined.

Advances in scientific methods of production and in transportation and marketing have also tended to make the big farm more efficient than the small. The need for complex management and expensive machinery has added to the trend toward larger farm and ranch operations. Operating costs—livestock, feed, seed, machinery, and fuel—have risen substantially in recent years, making large farms more economical to operate than small ones. The trend toward fewer and larger farms is expected to continue.

Because of these trends toward fewer farms and fewer on-farm workers, the greatest career opportunities in today's agriculture often lie in off-farm jobs that support the agricultural producer. If you're determined to go into business for yourself as a livestock producer, and you are able and willing to get the training, experience, and financial backing needed, you can—with hard work and intelligent planning—become a successful stockraiser. But don't overlook the many opportunities in the allied fields of animal health, applied genetics, research, the meat industry, and agricultural education.

To learn more about these and related career options, consider earning some of the following merit badges: American Business, Bird Study, Communications, Entrepreneurship, Environmental Science, Farm Mechanics, Horsemanship, Mammal Study, Plant Science, Public Health, Soil and Water Conservation, Truck Transportation, and Veterinary Medicine.

The rest of this chapter takes a closer look at some career possibilities in livestock production and animal science.

## Farm and Ranch Managers

Stockraisers are involved in genetics, business and economics, advertising and merchandising, nutrition, veterinary medicine, and agronomy and range science. Some are specialists, raising only one kind of stock. Others may have smaller herds or flocks of two or more kinds of livestock. Many ranchers and stockfarmers raise crops as well as livestock, growing nearly all of the grains and forages their animals need.

Whether the owner or an employee hired to oversee the farm business, the manager is the person who plans the operation of the farm or ranch, supervises the work, and makes the management decisions. The manager sees that animals are properly fed and cared for and that barns, pens, and other farm buildings are kept clean and in good repair. Managers of small operations may do much of the

work themselves, whereas those who oversee large spreads often have several employees to do the physical work. Although employment on many farms is limited to the manager and one or two family workers or employees, large farms and ranches may have dozens of full-time workers, such as the cowboys that tend the stock on big cattle ranches.

Besides the physical work, farm and ranch managers must make the business decisions required for modern farming. A manager who plans ahead may be able to take advantage of



**Ranch managers plan the operation of the farm or ranch, supervise the work, and make the management decisions.**

upswings in the market price for livestock, or protect the operation from price drops. The financial records of the operation and the production records of the herd or flock are the manager's responsibility. The manager probably will also need to secure loans from banks or credit agencies to finance the purchase of livestock, feed, equipment, and other needed items.

Although many small and mid-sized operations are managed by their owners, some of the largest farms and ranches are managed by professionals hired for the

job by an absentee owner, which may be an individual or a corporation. The professional manager does everything a self-employed farmer or rancher would do, but is a paid employee.

## Farm Workers

Members of farm families and hired workers do most of the work of modern farming and ranching. Livestock generally need a great deal of daily attention. Farm workers mix feed and additives and fill feed and water troughs. They clean barns and animal pens, check stock regularly for signs of disease or infection, and often vaccinate livestock against diseases or spray them with insecticides for protection against parasites. Laborers on dairy farms must clean and milk cows two or three times a day.

Many of the tasks farm workers perform require machinery, such as tractors, hay balers, and milking machines. Farm workers must have basic skills as mechanics and be able to set up, operate, maintain, clean, and repair farm equipment. They also maintain and repair barns, fences, and other structures.



**Livestock requires daily attention.**

## Off-Farm Occupations

Modern agriculture employs millions of people who do not work directly in food and fiber production. The number and variety of off-farm jobs have grown as the business and technical aspects of agriculture have become more complex. Among the off-farm jobs of special interest to the student of animal science are research, education, and production services.

## Research

Many scientists and technicians do research vital to farm productivity. Animal scientists study breeding, feeding, and marketing problems and develop improved methods of housing, sanitation, and disease control. Agricultural technicians generally help scientists with their experimental work. Technicians have the special training and skills needed to prepare animals for tests. They may set up and adjust instruments and equipment, conduct experiments under



the supervision of a scientist, and record the results. Animal science research is conducted by many universities and private industries and by the U.S. Department of Agriculture.

## Education

The technology of agriculture is developing rapidly. Teachers are a vital link between agricultural researchers and the farmers and ranchers who can use the knowledge gained in the laboratory or from the test herd. Vocational education teachers instruct secondary school and adult education classes in farm and ranch management, agricultural production, agricultural supplies and services, agricultural sales, processing of farm products, and related areas such as environmental resource conservation. Several two- and four-year colleges and universities in every state offer degree programs in the agricultural sciences, including animal science.

Cooperative extension specialists do educational work in areas such as agricultural production, community development, and natural resource conservation. Many conduct agricultural education programs through youth groups such as 4-H clubs.

## Production Services

As farms and ranches become larger and agriculture grows more complex, producers increasingly rely on off-farm specialists for livestock and crop services. Veterinarians, for example, provide health-care services to livestock. They test animals for disease, supervise programs to eradicate certain diseases, and conduct research to develop vaccines for disease control.

Some workers contract with farmers and ranchers to do basic animal care. Testers employed by dairy herd improvement associations travel from farm to farm to test the milk from each cow in a herd for acidity and butterfat content. Sheep shearers contract to shear the wool from flocks. Poultry hatcheries employ several types of animal caretakers to vaccinate poultry, place eggs on trays in incubators, and care for baby chicks.

Ranchers may hire technicians to artificially inseminate cows. Artificial insemination (AI) is an increasingly popular breeding method that eliminates the cost and risk of owning bulls, allows the use of outstanding herd sires at a fraction of the cost of actually buying the bulls, and makes it possible to get far more calves sired by an outstanding bull than could be had from natural breeding. Because AI is a complicated procedure, however, many ranchers prefer to call in a veterinarian or a trained AI technician.



**The number and variety of off-farm jobs have grown as the business and technical aspects of agriculture have become more complex.**

## Inspectors

Meat and poultry inspectors work for the U.S. Department of Agriculture and for many state departments of agriculture. Working under the supervision of a veterinarian, they inspect meat and poultry slaughtering, processing, and packaging operations to ensure that proper sanitation is maintained. They also inspect meat additives and make sure that processed meats are correctly labeled.



## Agricultural Commodity Graders

Graders inspect agricultural products to determine their quality and grade, and issue grading certificates. They generally specialize in a particular commodity, such as eggs or dairy products.

## Working Conditions

If you love animals and the outdoors, life as a stockraiser could suit you perfectly. But never doubt that it's often a difficult life. Animals must be fed and watered every day, and dairy cows must be milked at least twice daily, the year round. Because of the demands of their livestock, farmers and ranchers rarely take vacations.

For off-farm occupations, working conditions vary. Researchers and educators generally work in offices and laboratories and have fairly regular hours. Veterinarians, however, may have to work in uncomfortable surroundings, such as outdoors in all kinds of weather.

## Preparing for a Career

Growing up on a family farm or ranch and taking part in programs for young people such as Future Farmers of America or 4-H is important training for prospective livestock producers. However, because of the scientific and business complexities of modern farming and ranching and the need to keep up with advances in farming methods, many young people who grow up on farms and ranches also attend a two- or four-year college of agriculture before launching their own careers in livestock production. For someone who wants to become a farmer, rancher, or farm manager but who has not had the advantage of living or working on a farm or ranch, a degree in agriculture is essential.

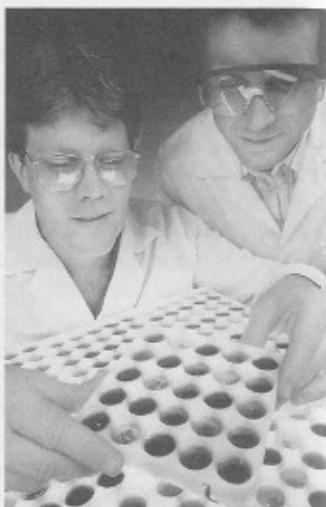
Many colleges of agriculture offer four-year degree programs in general agriculture, agronomy, soil science, animal science, agricultural economics, agricultural business, food science, agricultural education, agricultural engineering, natural



resource conservation, and related fields. Graduate programs leading to master's and doctoral degrees also are available in many of the same fields. Although a bachelor's degree usually is enough for a livestock producer, related jobs in animal science, breeding, and research may require an advanced degree. Colleges of veterinary medicine offer professional training leading to the doctor of veterinary medicine degree.

Students can learn many technical and service jobs by completing programs at technical schools or junior colleges. Many schools offer programs in agricultural production, agricultural supply and service, agricultural mechanics, and other specialties. The training may last only a few weeks, or students may enroll in a two-year degree program, depending on the subject.

Many farm laborers can learn their jobs on the farm and need little or no outside training. Some farm laborers, however, do specialized jobs, such as machine operator, for which training and experience are needed. Opportunities for advancement for farm laborers are limited, but some advance to farm labor supervisors, and a few may have the chance to become farm managers, or to one day own a farm or ranch of their own.



## For Additional Information

For general information about farming and other agricultural occupations, contact:

### **American Farm Bureau Federation**

General Office  
225 Touhy Avenue  
Park Ridge, IL 60068  
Phone: 847-685-8600  
<http://www.fb.com>

### **Future Farmers of America**

National FFA Headquarters  
1410 King Street, Suite 400  
Alexandria, VA 22314  
Phone: 800-772-0939  
<http://www.ffa.org>

### **National Association of State Universities and Land-Grant Colleges**

1307 New York Avenue NW, Suite 400  
Washington, DC 20005-4701  
Phone: 202-478-6040  
<http://www.nasulgc.nche.edu>

### **National 4-H Council**

7100 Connecticut Avenue NW  
Chevy Chase, MD 20815  
Phone: 800-368-7432  
<http://www.fourhcouncil.edu>

### **U.S. Department of Agriculture (USDA)**

1400 Independence Avenue SW  
Washington, DC 20250  
Phone: 202-720-2791  
<http://www.usda.gov>