

FARM ANIMALS

by Gaeta Bell

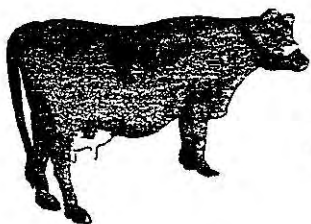
The process of people moving from hunter-gathers to keepers of livestock and farmers began about 10,000 years ago. Why this happened is not known. Was the environment changing? Were their numbers increasing too rapidly to be sustained? Was it a natural progression in human development? Regardless of its cause, the results, over time, dramatically effected our way of life. Today, our way of life is such that very few of us participate in the growing or raising of our food or making of our clothes. Farm animals provide us with some of our basic food and clothing needs. On a stroll through Ardenwood's farmyard you'll encounter some of the more familiar farm animals.

THE RUMINANTS

Cows, sheep and goats are all mammals known as ruminants. They have an elaborate digestive system complete with four stomachs! First, food is swallowed without chewing it completely. The food goes into the *rumen* where it is stored and broken down into cud. Later the cud is regurgitated into the mouth, chewed into a pulp, and swallowed, this time into the *reticulum*. In the reticulum, inedible fragments of stone are trapped while a remainder of the pulp is strained into the *omasum*. From the omasum the food goes into the *abomasum* where digestion is completed.

CATTLE

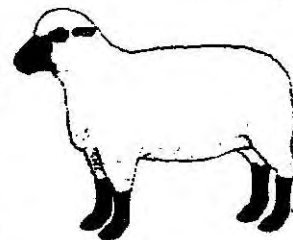
Cattle were first domesticated 9,000 years ago in Southern Eurasia. Adults can weigh as much as 2,000 pounds. A baby is called a calf, a young female is a heifer, an adult male is a bull, and an adult female is a cow. Horns grow on cows and bulls in most breeds but the horns are usually cut off when the cattle are young. Cattle are herbivores-they eat only plants and have no upper front teeth. A cow starts producing milk only after her first calf is born. She is then milked twice a day producing about five gallons of milk daily. Along with producing milk and its by-products (cheese, yogurt, butter) and meat (beef) cattle are also used as draft animals, pulling carts, ploughing fields and carrying loads.



SHEEP

Sheep were domesticated approximately 11,000 years ago. Most modern breeds originated from the Middle East and Western Asia. Due to the many varieties of sheep, their adult size ranges from 150-300 pounds. Young sheep are called lambs, an adult female is a ewe, and an adult male is a ram. Sheep are herbivores, eating pasture grass, weeds, shrubs, grains and hay. Only the

lower jaw has front teeth so a sheep must tear pasture grass by jerking its head forward and up. Approximately 60% of sheep are raised for food production. The other 40% are raised for wool which is made into yarn for clothing, carpets and upholstery. Sheep bred for their wool (such as those here at Ardenwood) have been selected for the absence of an outer coat and presence of a plush white undercoat which grows year round.



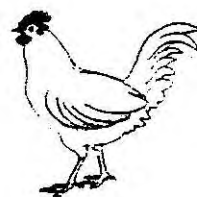
GOATS

Goats were among the earliest domesticated animals. Along with sheep they were first domesticated in the Middle East and Western Asia. Adults range in size from 140 to 190 pounds. A baby goat is called a kid, adult female is called a doe, an adult male is called a buck. Both does and bucks have horns. Goats are browsers, meaning they eat a large variety of plants. Goats provide many useful products for humans, goats milk is more widely consumed worldwide than the milk of any other domesticated farm animal.

CHICKENS

Most of the 200 domesticated breeds of chickens are descendants of the Red Jungle Fowl of India. A young chicken is called a chick, an adult female is a hen, an adult male is a rooster and a group of chickens is called a flock. Chickens are categorized in two sizes; large and bantam; bantam being 30% smaller than large chickens. Female chickens start laying eggs at about six months of age. Hens lay an average of 4-5 eggs per week. Their feet have sharp claws which they use to scratch for food or hang onto branches. The comb is the decorative feature on the top of the chickens head. The wattle dangles under the bird's chin.

Chickens are omnivorous, eating insects, grains, grass, and weeds. They have sharp beaks for pecking grains and seeds. Their food goes into a pouch at the base of the neck called the "crop". The food then passes into the gizzard, where it is ground up for digestion. Chickens use small pebbles or are fed grit or ground oyster shell to aid in the digestion of food. Hens lay eggs year round but lay fewer from autumn through winter. Eggs come in a variety of sizes and colors depending on the breed of chicken. You can watch a chicken clean itself by fluffing dust into its feathers. Chicken manure makes great fertilizer.



SWINE

All domesticated swine are descendants of one species, the wild boar (*Sus scrofa*) originally found in Europe, Asia and North Africa. A baby pig is called a piglet, an adult female is a sow, an adult male is a boar. Swine weighing less than 120 pounds are called pigs, greater than 120 pounds are called hogs. Pigs grow faster than any other farm animal, reaching adult size (up to 800 pounds!) in one year. Pigs are omnivorous, eating just about anything. They use their snout (nose) to dig in the soil looking for food. The snout is tough cartilage containing sensitive smelling pores. Pigs cannot regulate their body heat by sweating because of a thick subcutaneous fat layer and relatively hairless skin, so they cool themselves by "wallowing", making a bed in moist dirt and wetting their skin.





ARDENWOOD'S DRAFT HORSES

by Jessica Sheppard

HORSE HISTORY

Ardenwood invites you to experience life on the farm as it was around the turn-of-the-century. In this unique setting you can imagine you are walking through the gardens of an affluent Victorian family, taste food freshly cooked in the style of a by gone day, and help with the daily chores that kept a farm running smoothly. Back then, farm animals provided the family with meat, milk and eggs, but the most valuable animal on the farm was the horse.

Although it was once commonly believed that all horses could be traced back to one breed, the Prjevalsky's horse. It is now known that modern breeds of horses can be traced back to four distinct different geographical breeds of horse, as well as hybrids. Today, there are more than 300 breeds of domesticated horses.

USEFUL COMPANIONS

Horses have been human's most useful companions since the beginning of their long and colorful relationship. They have contributed more to the progress and pleasure of human beings than any other animal. In the early efforts to express themselves, humans captured the form of horses on cave walls 10,000 years ago in southern France. Sometime between 3000 and 2000 B.C.E., horses were first tamed and bred in captivity. They were the last of the five most common livestock animals to be domesticated and are still most like their wild ancestors. Originally horses were probably kept for meat and milk. It is still disputed whether horses were first put in harness or ridden.

Horses have historically been utilized for their strength stamina, and speed. As agriculture became a widespread way of life, the horse's strength enabled a farmer to be more productive: most often these were draught horses, mules or hybrids. After the increase in mechanization following World War II the use of horse power in agriculture dropped dramatically. Today, few horses are used on American farms.

DRAUGHT HORSES

Draught horses as a group are typically called "cold-blooded" breeds. This term refers to their calm and quiet temperament, not to their body temperature. These "Gentle Giants" once dominated the horse-breeding scene, in some countries comprising 80% of the equine population.

These horses have medium to heavy bodies, strong legs, and large hooves, usually covered with hair called "feathers". Their short, muscled necks carry their bulky, and very expressive heads. France has been the most influential country in the breeding history of the cold-bloods. Though there are many breeds, five of the most popular and well-known are **Shire**, **Belgian**, **Percheron**, **Clydesdale** and **Suffolk**. We have most of these breeds at Ardenwood.

SHIRE is the world's largest breed weighing up to 2,860 lbs. (1300 kg). They were originally bred to carry knights into battle with heavy armor and are very strong but far from clumsy.

BELGIANS are one of the most powerful of the draught breeds for their weight, and can pull the heaviest loads. They weigh over 2,200 lbs. (1000 kg). Mostly chestnut-colored or red roan, occasionally dun (a light tan).

PERCHERON: Weighs up to 2,200 lbs. (1,000 kg.). Relatively small, fine head and freedom of movement betrays their Arab ancestry. Usually gray colored, always born black.

CLYDESDALE: Originated in Scotland in the 18th century, still very popular especially in the United States, Australia, New Zealand and South Africa. Became well-known through beer commercials. Chocolate brown with white legs and usually white splashes under belly.

SUFFOLK: From the English county of Suffolk. Known for it's ability to thrive on meager rations, unlike the Shire. Chestnut colored, short-legged, very strong and compact.

ARDENWOOD'S HORSES

The draught horses you see at Ardenwood are used in very much the same way they were used at the turn-of-the-century. These versatile animals were the only means of travel and crucial to the heavy work needed on a farm.

The main means of long-distance travel included both horse-drawn wagons and rail cars. A horse-drawn, narrow-gauge spur line of the South Pacific Coast Railroad ran between Newark and Centerville. From 1877-1906 people in southern Alameda County used this horse-railroad system to get around. Currently Ardenwood has a mile and a half of narrow-gauge (36") track laid to simulate this mode of travel for visitors to our farm.

For short and long distance travel, every farm had a horse-drawn wagon. Generally, these were drawn by a team of horses. You can ride back in time on Ardenwood's wagon. The horses at Ardenwood also plow, disk, harrow, spread manure, bring in the crops and provide horse power for many other farm tasks. Check the schedule to discover what their job might be today.

Horses have contributed to the productivity of our farms throughout history. At Ardenwood they continue to provide the horsepower necessary to sustain a working farm our size. While visiting Ardenwood Historic Farm, be sure to admire the horses whether they are pulling wagons, trains, farm equipment or simply resting in the farmyard.



CORN ON THE FARM

By Ira Bletz



In April, as Ardenwood starts a new season of planting, we begin preparing for October's Harvest Festival special event by planting our corn crop. Ground preparation begins in December with the planting of a cover crop. Like a blanket, this mixture of peas, beans, and vetch protects the field during the winter. These legumes also enrich the soil by fixing nitrogen from the air into the soil, making it available for future plant growth. This fixing is very important since corn is a heavy feeder, drawing heavily upon the soil.

Usually in mid to late April, we will plant around five acres of Indian corn and popcorn using a combination of horse and human power. Most of Ardenwood's annual corn production is given away to the army of huskers who descend upon the field in October. Some of the crop is saved for seed with the rest being used in the Country Kitchen as part of our interpretive program or cracked and used to feed the farm animals.

From its ancient and unassuming beginnings, corn has become the New World's important contribution to human food supply; second only to wheat in total production. Corn was first domesticated from a wild grass species growing in the highlands of Southern Mexico between 3,500 and 5,000 years ago. In those days, the corn's cobs were only between $\frac{1}{2}$ and 2 inches long. By the time of Columbus' arrival corn had spread both north and south from Central America with 200-300 varieties being grown.

Columbus, upon returning to Spain from his second voyage introduced corn to Europe. and within 50 years it had spread to Africa, India, and China.

Throughout most of the world, what we call corn is known as maize. The name comes from "maize", the name given the plant by the West Indian natives Columbus encountered. In Europe, the word corn is used as a generic name for the most common grain - anything with kernels. In England "corn" is used for wheat, in Scotland oats, and the "corn" mentioned in the Bible was barley.

There are five types of corn grown in the world today. Their type is determined by the hard or softness of the endosperm (the part of the seed that holds the food for the developing plant) in each kernel. These corn types are:

Pop - a high protein corn with very hard starch.

Flint - also known as Indian Corn, another high protein hard starch corn.

Flour - a low protein, hard starch corn which is sometimes called Indian corn.

Dent - a mixture of hard and soft starches. Soft starch at the kernel's tip sinks as it dries to form the "dent". This is the most common type of corn grown for livestock feed.

Sweet - a chemical process inside the kernel prevents much of the sugar from being converted into starch so the corn stays soft and sweet. It was grown by prehistoric "farmers" from Peru to central and eastern North America.

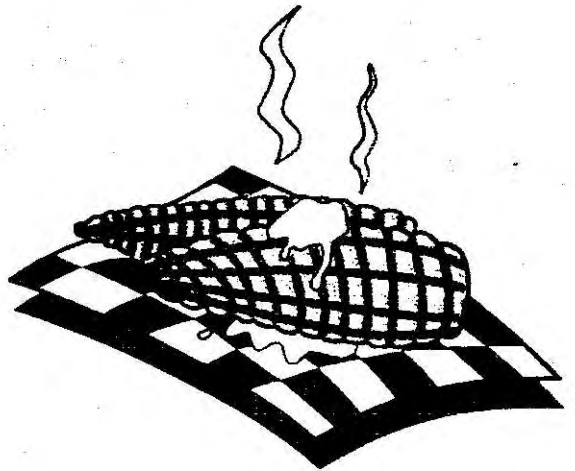
Corn has undergone some of the most intense efforts at improvement of any food crop. Charles Darwin, in 1876, produced the first hybrid variety. During the late 19th and early 20th centuries, the goal of many farmers and plant breeders was to produce the perfect ear of corn, uniform in kernel and cob. Competitions and expositions were common in corn growing regions and Corn Palaces sprang up across the country to show and sell prize winning corn.

By the 1930's hybrid corn seed was being sold and many farmers switched from the older open-pollinated varieties. By 1970, over 70% of the U.S. corn crop was made up of only 6 genetically similar varieties. Remember the Irish Potato Blight and Famine? The same thing nearly happened to the U.S. corn crop when the Southern Leaf blight attacked. Genetically similar varieties offered little resistance to the disease and it spread quickly across the Midwest. The loss was devastating, with 15% of the total crop or 1.2 billion bushels of corn destroyed. In some states the losses reached 50% of the crop.

This near calamity sent shock waves through the agricultural world and millions of dollars were suddenly earmarked for research and projects to expand the gene pool of corn and other important food crops. Much of this work is keeping old varieties alive and growing to preserve irreplaceable genetic material.

Annual corn production in the U.S. is 8 billion bushels; of which 50% goes to animal feed, 25% is exported, 15% is used for everything from corn syrup to starch, oil to whiskey, and the remaining 10% reaches our dinner tables.

At Ardenwood our 5 acres of corn give people a chance to participate in the process of producing a crop: taking it from the corn crib- in April through shelling, planting, weeding, harvesting, and returning part of the bounty to the cribs in October!





FIAT PANS LET THERE BE BREAD



More than any other plant, wheat has altered the course of human history. About 10,000 years ago, people living somewhere between the shores of the Mediterranean Sea and the Western slopes of the Himalayas began to settle down. They gave up their hunter-gatherer ways and agriculture was born.

Wheat, a grass in the genus *Triticum* (from the Latin *tritus* - to grind) was a common weed growing throughout Asia Minor around 7,000 BC when early farmers began to domesticate it. Wheat had a dramatic effect upon human societies, villages were established each with its own grain field. This led to population increases, the development of more complex social organizations and the need for record keeping. Some of the earliest alphabets and number systems were created to record grain transactions.

Wheat and barley were the first cereal grains to be cultivated. Besides being critical in the evolution of human culture these grains have given us bread, beer and pasta. The edible seeds contain protein, carbohydrates and have the ability to be stored for a very long time.

Between 5,000-4,000 BC, wheat was being grown along the Nile. Legend tells us that ancient Egyptians were cannibals until the Goddess Isis returned from Lebanon with wheat and barley. These grains so changed Egyptian society (not to mention dining habits) that before long the year was divided into three seasons: Flood, Sprouting of the Seeds and Harvest of the Grain.

Sometime around 4,000 BC the Egyptians made another discovery about wheat. Usually water was mixed with wheat flour to produce unleavened breads. Many bakeries of the time were also breweries. Somehow the brewers/bakers discovered that substituting ale (with its live yeasts) in place of water produced dough that rose and a bread lighter in texture. Bread as we know it was born.

The ancient Egyptians placed wheat in tombs to germinate as a symbol of resurrection. The pyramids of Cheops were built by workers fed beer and three loaves of bread each day (and cucumbers). Extensive trade networks developed around wheat and the grain began its world-wide distribution. By 2,000 BC, wheat had arrived in China and was spreading across Europe.

The Greeks and Romans took to wheat (and bread) with a passion. Often grape juice was used as the leavening agent. As the juice fermented the bread would rise. It was here, in ancient Rome that the status of bread and bakers rose to new heights. Bread became a meal unto itself. For the first time white bread came to represent a higher social class and bakers were given their own delegates in the Senate. The Romans even worshiped Robigus, a god to protect wheat from rust - an age old plant disease.

There was no wheat (or rye, oats, barley, millet or rice) in the New World before Europeans arrived. Maize was wildly grown throughout the Americas. On his second voyage Columbus planted wheat to "pave the soil." It did well and this news delighted officials back in Spain. The Spanish had inherited many advanced agricultural practices from the Moors and they saw Columbus' early success as a way for Spain to dominate Europe's wheat market.

In 1592, a shipload of wheat arrived in Mexico to establish a Spanish grain empire in the New World. But the newly arrived Colonists, like the native inhabitants had come to prefer Maize. This was understandable since wheat took three times as long to grow and produced less food per acre. Despite a slow start wheat caught on. Spanish missionaries carried wheat and taught grain farming. In 1769, Father Serra brought wheat to California and grain fields were established along with the missions.

On the other side of the Continent nearly every American colonist seemed to be bringing wheat along from Europe. Jamestown in 1611 and Plymouth in 1621 both had successful grain harvests. Home grown wheat bread was even served at the first Thanksgiving.

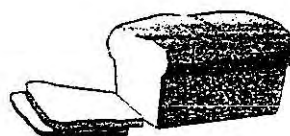
During the American Revolution Vermont wheat farmers so supported the Continental Army that their state became known as the Bread Basket of America. Thomas Jefferson and George Washington, like many other of their contemporaries, were wheat farmers. George even exported his own Mt. Vernon brand of flour.

Pioneers moving west took wheat with them and the placement of new towns and villages was influenced by the need to be near running water to power grain mills.

During the late 1700s and early 1800s a war torn Europe faced hunger and unrest as bread became scarce. Letting them eat cake just didn't work so England, France and Germany all began importing American wheat. A wheat boom for American farmers developed, fueled by increasing foreign demand. Wheat was still harvested by hand and the bounty of America's grain fields surpassed farmers' ability to harvest it.

Millions in Europe wanted bread and American wheat fields went unharvested due to lack of equipment. Clearly this necessity became the mother of invention. In 1837, John Deere patented the steel plow. This was followed in 1842 by the seed drill which greatly improved planting. Five years later the first mechanical reapers were being sold to wheat farmers around Chicago.

Now that the crop could be harvested farmers needed a way to get the grain to market. Road, canal and especially rail systems were constructed to carry wheat from the farm to ports for shipment to a hungry Europe.



With the discovery of gold at Sutter's Mill wheat was again carried to California, this time in the pockets and packs of the forty-niners. With thousands of new mouths to feed a ready and lucrative market for food quickly developed. Many failed gold seekers (like Ardenwood's George Patterson) became wealthy growing wheat and other food crops. Southern Alameda County became a major grain producing area.

By the late 1800's the Federal government was looking to expand wheat production into the northwestern states. At the time, most of the wheat grown in the country was winter wheat - planted in the Fall and harvested in late Spring or Summer, but these varieties couldn't survive the harsher winters and Spring frosts of the northern states.

In 1898, the U.S. Department of Agriculture sent cerealist Mark Carleton to Russia. He returned with two hearty varieties of durum wheat. These Spring wheats (planted in the Spring for a Fall harvest) were disease resistant and did well in the dry northern climates. Two years after durum wheat's introduction 60,000 bushels were harvested. By 1907, the harvest had grown to 45 million bushels.

Over the years wheat has continued to spread around the world. It is now the most traded of all edible commodities. More wheat is harvested (445 million metric tons) in a year than rice, barley, rye, oats or corn. Every month of the year some wheat is harvested somewhere in the world.

In the United States, 80 million acres of farmland is planted in wheat. And why not? A ton of wheat with very few additions, could sustain a family of five for a year. An average American eats 115 pounds of wheat and wheat flour products in a year. So take your pick - soft or club wheat in cakes, pastries or biscuits; hard wheat for breads or durum semolina for pasta. Which ever you prefer, you'll be eating a high protein (12%), high carbohydrates (71%) and low fat (2%) fruit (yes, wheat is a fruit!) That has changed the course of human civilization.

*Ira Bletz
Supervising Naturalist
Ardenwood Regional Preserve*

