

This letter follows one which I emailed on February 22, 2014, under the title,
“Animal Management and Animal Welfare at the Snake River Farm”

In the first letter, I wrote briefly about the herd structures formed by the animals we raise. That includes bison, cattle, horses, hogs and sheep.

I have changed my writing plan in response to questions and comments from you.

Some of you wrote and claimed to have an appetite for more basic information about livestock. Michelle requested that I include goats. I have raised goats a number of times but I cannot claim to know goats well. Nevertheless, I will include information about goats whenever possible.

In this letter, I will describe animal senses and animal brain function in general terms.

We think of animals as being inferior to us mentally. We base that on our cognitive ability.

Taken in total that is true, but in some specific areas, that is incorrect.

Some animals are probably superior to us in two significant areas. **Senses and memory.**

The animal species I am writing about are all considered prey animals.

The **eyes** of prey animal are located on the sides of their heads. That makes it possible for them to detect approaching predators from almost any direction. Superior side vision does limit their binocular vision. Binocular vision is necessary for good depth perception.

In general, binocular vision in prey animals is limited to a narrow area directly in front of them. This is the area where they can focus both eyes simultaneously.

This effect is most prominent in horses, less so in hogs and sheep.

Because we rely heavily on binocular vision we tend to think that their way of seeing is inferior. It is not. It is well suited to their nature.

A horse's hearing is much keener than humans. They use their hearing for three primary functions: to detect sounds, to determine the location of the sound, and to provide sensory information that allows the horse to recognize the identity of these sounds. Horses can hear low to very high frequency sound, in the range of 14 Hz to 25 kHz (human range = 20 Hz to 20 kHz).

Horses' ears can move 180 degrees using 10 different muscles (compared to three muscles for the human ear) and are able to single out a specific area to listen to. This allows the horse to orient itself toward the sounds to be able to determine what is making the noise.

A horse's hearing is similar in range and tone to that of humans. Horses' ears can rotate about 180 degrees, however. This unique anatomical feature allows horses to focus on the direction from which the sound is coming, isolate it, and run the other way.

Horses can respond to a training command given at a very low volume. We don't need to shout to be heard. Also, horses are very sensitive to the tone of voice. We need to use a confident tone and avoid overly emotional tones such as shrill, high pitches. We also want to give voice commands in a way that gives the horse tools to distinguish them.

For example, if you are longeing a horse at a walk and want to perform an upward transition to a trot, you may want to divide the word “trot” into two syllables and raise your voice an octave as you say “to – rot”! When performing the downward transition from the trot to the walk, you would lower your voice an octave on the second syllable of “wa – alk.”

For millennia, the horse has depended on its visual abilities for its survival. In the current world, survival has become less of an issue but the visual function of the horse is still critically adapted to a “flight” response from threats or predators. Therefore, understanding horses normal vision is critical to understand normal behavior and the effects of disease on vision. Changes in vision secondary to disease can result in abnormal behavior and poor performance.

WHAT DOES THE HORSE “SEE”?

The horse’s vision is adapted to function in both bright light and dim light. The act of seeing is a complex process that depends upon: 1) light from the outside world falling onto the eye, 2) the eye transmitting and focusing the images of these objects on the retina where they are detected, 3) the transmission of this information to the brain, and 4) the brain processing this information so as to make it useful.

VISUAL PERSPECTIVE AND FIELD OF VIEW

Visual perspective varies greatly depending on whether the horse’s head is up or down (i.e. grazing) and how tall it is (i.e. miniature horse or a draft breed). The position of the eyes in the skull of a horse allows for a wide, panoramic view. Their visual field is enormous (up to 350°) and provides nearly a complete sphere of vision with few small “blind spots”.

DEPTH PERCEPTION

Stereopsis (binocular depth perception) is the fusing of 2 images from slightly different vantage points into one image. If the image from both eyes did not fuse, double vision would result. A horse’s depth perception is generally good. From 2 meters away horses can detect a 9-cm difference in depth, which approximates the ability of a cat. The work to detect variation among horses has not been done. This comes in very handy when jumping over objects!

MOTION DETECTION

Horses maintain the image on the retina during motion in much the same way as do people, and like people, they more easily detect moving objects than stationary ones. The ability to detect motion is greater in the horse’s peripheral visual field. Visual acuity is also low in this area and may explain, in combination with the horse’s prey mentality, why horses shy so easily from objects located in their peripheral visual field.

VISUAL ACUITY

Visual acuity is the ability to see the details of an object separately and without blurring. In humans, the most familiar method of measuring visual acuity is to ask an observer to read an eye chart. The horse cannot read an eye chart, however, visual acuity has been estimated at 20:30 to 20:60. This means the horse’s visual acuity is among the best of the domestic mammals and better than that of many people.

REFRACTIVE STATE

The refractive state is based on an image being accurately focused on the retina. If not focused on the retina, the image can be focused in front of the retina (i.e. myopia) resulting in near-sightedness or behind the retina (i.e. hyperopia) resulting in far-sightedness. Although some individuals are slightly myopic or hyperopic, the average resting refraction is near normal in the horse. Various diseases can result in refractive errors and possibly result in behavioral changes or poor performance.

COLOR VISION

Because many predators also evolved coat colors that closely matched the background in terms of color, and in some cases texture, color is a relatively poor way for the horse to “break the camouflage” of a predator. This may mean that color detection became relatively unimportant and therefore not very useful to the horse.

Humans typically have trichromatic color vision. The 4 basic hues seen are blue, green, yellow, and red. Horses have only dichromatic color vision. This results in horses seeing only 2 unique hues, yellow and blue. It is probable that this also results in colors appearing as washed-out pastels or sepia. Horses most likely have difficulty in differentiating orange and blue much like some color-blind men cannot differentiate between red and green. In effect, the horse is believed to have a form of color blindness and sees only yellow, blue, green and gray. Why does your horse always spook at the red fence then? It is probably not the color but other factors such as its brightness, etc.

VISION ASSESSMENT IN HORSES

Currently, veterinarians are unable to recognize anything but the most serious visual changes in horses because of the crudeness of the visual testing tools the clinician has available to them. Known diseases such as cataract and corneal scarring probably affect vision in the horse in much the same way as the diseases do in humans. Behavioral or orthopedic issues can frequently masquerade as visual problems. Any time you suspect a visual abnormality in your horse you should have him evaluated by your primary care veterinarian. A referral to a veterinary ophthalmologist can then be obtained for further examination and testing, if an ocular problem is suspected.

Cattle have an incredible sense of smell, they can detect odours up to five miles away and can they can hear low and high frequency sounds better than humans.

Sight

- Cattle have a well-developed eye that sees some colour but not as much as humans.
- They generally avoid bright light if given preference.
- The position of each eye allows very wide peripheral vision along the side.
- This alerts the cow to movement which is then investigated using binocular vision.
- A good side view is useful for watching where other animals are during grazing with head down. So cattle have nearly 360° vision as they move around when grazing.
- Using two eyes, the cow has a much narrower binocular vision (about 25-50°).
- We exploit the wide peripheral vision when moving stock using their "point of balance" just behind the shoulder.
- Cattle have a narrow blind spot at the rear where they are vulnerable, so they move a lot to keep checking it out.
- Cow's eyes are designed to see down rather than up. When alarmed will raise head to investigate.
- A bull in fight response uses one eye to watch you, but is getting his head ready for sideways swipe at same time.
- Cattle can recognise different people from their shape and colour of clothing. They can also count, and associate more than one person or someone in green overalls, with pain or stress of injections or forced handling.

Hearing

- Cattle are sensitive to high frequency sounds which people cannot hear.

- These high frequency sounds can increase arousal and low tones are more relaxing for them.
- Music is regularly used in milking parlours to provide cows with a familiar background noise.

Smell

- Cattle have a better sense of smell than people.
- The smell of blood can cause great panic. This is seen when cattle pass paddocks treated with blood and bone fertiliser.
- For some unknown reason, this panic is not consistent but is very real.

Touch

- Cows have a very sensitive skin and can flick flies off from localised areas.
- Cows respond to touch and use it as an important form of communication among each other.
- Mutual grooming is important in cattle, especially in mature animals.
- Dams lick and groom their calves right up to weaning.
- Touch is important for handlers to warn cows where you are - e.g. when milking.
- One really bad experience by cattle will put them off all people for a considerable time till a positive human/animal bond is restored.

- Pigs are extraordinarily intelligent. They are curious and insightful animals who are widely accepted as being smarter than young children of at least 3 years of age, dogs, and even some primates.
- Pigs are extremely social animals. They form close bonds with other individuals and love close contact and lying down together.
- Pigs are very clean, keeping their toilet area far away from where they lie down and eat. Even newborn piglets will leave the nest to go to the toilet within hours of birth.
- Pigs are very peaceful animals, rarely showing aggression. The exception, as with many animals, is when a mother (sow) with her young offspring is provoked or threatened.
- Wild pigs play an important role in managing ecosystems and maintaining biodiversity. By rooting, and thus disturbing the soil, they create areas for new plant colonisation. They also spread fruit plants by dispersing their seeds.
- Pigs have a tremendous sense of smell. The large round disk of cartilage at the tip of the snout is connected to muscle that gives it extra flexibility and strength for rooting in the ground.
- Winston Churchill famously said that “Dogs look up to man. Cats look down to man. Pigs look us straight in the eye and see an equal.”
- There are numerous stories of pigs that have saved the lives of humans. For example, a pet pig called Pru pulled her owner out of a muddy bog, and another, Priscilla, saved a young boy from drowning.

- The pig is the last of the 12 animals in the Chinese zodiac. The pig is seen to represent, fortune, honesty, happiness and virility.
- The meat of pigs is widely eaten by people across the world. Many people who consume animal products would like to choose products from animals kept in higher welfare systems. However welfare labelling on products can be confusing. [Find out more about OneKind's campaign for Better Food Labelling.](#)
- Pigs are used in experiments in the UK. [Find out more about OneKind's Let's not turn back the clock on cruelty campaign to ensure welfare standards in the UK are not lowered.](#)

PIGS

In nature, pigs are essentially survivors—a relic family of mammals who thrive in conditions that few other animals can endure. As true opportunists, they are guided by their keen senses, complex reasoning, and tempered instincts. In their native forests and grasslands, resources are often inconsistent and unreliable. As a result, their diet is extremely diverse—including fruits, nuts, roots, eggs, bulbs, fungi and anything else that is available. Living in an environment of perpetual change, pigs have learned that their survival is dependent on a nomadic lifestyle, commonly traveling several miles each day.



Petunia. Photo by D. Goodwin, courtesy of Farm Sanctuary.

Descended from the European wild boar, domestic pigs share many of their ancestor's physical features and behavioral tendencies. Cloven hooves enable them to run surprisingly fast, while thick skin and coarse hairs protect them from extreme temperatures. In areas with intense heat, pigs seek out shallow watering holes or large mud puddles. Perhaps most impressive is the pig's highly specialized snout. A cartilaginous disc at the end of the snout allows them to forage through dense leaf litter and soil that other animals cannot access. Combined with an acute sense of smell, the pigs are able to locate fragments of food with astonishing precision—even through thick layers of snow.

The breeding season is an intense period for wild boars, but relatively uneventful for domestic pigs. In the wild, males become increasingly aggressive, using their tusks to establish a hierarchy. Most domestic pigs lack these tusks, as well as the instinct to fight.

As spring draws near, each member of the group helps to bring vegetation to the communal nesting site. At the end of the four-month gestation period, the female distances herself from the group, digs a small depression in the soil and lines it with the leaves and grasses that the others collected. The

mother and her offspring band together with other mothers and reside in small groups known as “sounders.” The piglets spend much of their time playing-tirelessly wrestling and chasing each other. Mothers are extremely protective and vocal, communicating with their young through a variety of grunts and other calls.

Domestic pigs come from an ancient lineage of wild ancestors who evolved to live in harmony with their environment. They are curious, intelligent animals with strong instincts and a resourceful nature. Numerous researchers have concluded that pigs are more intelligent and have better memories than most dogs. Capable of living over 20 years, their lives are stimulating and complex.

In industrial animal factories, pigs live extremely monotonous lives, in varying degrees of confinement. Unable to fulfill their most basic instincts and desires, the pigs show many signs of physical deterioration and mental collapse. From the day they are born until the day they are killed, there is no relief from their intense frustration.



Photo courtesy of Viva!USA

The process begins with the “breeding sows.” After being artificially inseminated, they are confined in what the industry refers to as a “gestation crate.” During their four-month pregnancy, they never leave the 2-foot wide crate that is essentially the length and width of their body. Unable to turn around, and barely able to lie down, the sows bite the metal bars of the crate in frustration. Even more disturbing is the sound of these pregnant pigs repeatedly banging their heads against the metal doors.

When she is ready to give birth, the mother pig is moved to a “farrowing crate” that is roughly the same size as the gestation crate. She is unable to turn around or take a free step. Over the next few weeks, the piglets nurse from their mother, who lies on the barren concrete floor. The area is occasionally hosed down to rinse the excrement into manure pits.

After two to three weeks of nursing, the young are removed and the female is impregnated once again, and returned to the gestation crate. This is how she will live until her breeding rate declines and she is killed.

Her piglets are taken to an area cryptically termed the “nursery.” They quickly become frustrated by the lack of stimulation and resort to biting and other aggressive behaviors. The industry’s solution is to cut off the piglets’ tails and clip their teeth. For identification purposes, part of the ear is cut out as well. These painful mutilations are performed without the use of anesthetics.

Once they have reached 30-80 pounds, the young pigs are transferred to massive sheds with concrete floors and minimal ventilation-what the industry refers to as a “finishing” facility. Here they are intensely fed until they reach the desired weight for slaughter.



Photo courtesy of Viva!USA

Some of the largest industrial farms house more than 5,000 pigs. ^[1] In these overcrowded conditions, the pigs' acute sense of smell becomes a source of suffering as they are exposed to noxious levels of ammonia for several months. Respiratory disorders are not the only problems these pigs face. Crippling leg disorders are common due to the unnatural flooring, as well as a lack of exercise. In fact, many of the pigs do not survive long enough to reach the final weight of 270 pounds at approximately six months of age.

Pigs are transported to slaughtering facilities in large multi-level trucks. Current laws allow transporters to travel up to 28 consecutive hours without a rest period. The 28-hour period can be extended to 36 hours by simply submitting a written request. ^[2] During this time, the animals are deprived of food and water. Vomiting and diarrhea are common due to hours of vibration and maneuvering. Many of the pigs die before reaching the slaughterhouse due to either extreme weather or porcine stress syndrome (PSS)-a neuromuscular disorder that is triggered by physical and/or mental stress. According to the most recent USDA animal disposition report, in one year, nearly 277,000 pigs were dead when they arrived at the slaughtering facility. ^[3]

When the pigs reach the slaughterhouse, they are guided down a ramp into a restraining chute. The pigs squeal continuously as they are forced closer to the front of the line. When they reach the front, they are killed by one of two methods.

Many facilities kill pigs by electrocution. After being wetted down to facilitate electrocution, one electrode is placed on the pig's forehead and another on the back. An electrical current surges through the pig's brain and heart for 2-3 seconds, causing cardiac arrest and a fatal epileptic seizure. Many facilities electrocute only the head, which is considered potentially "reversible" if the animal is not bled completely within 15 seconds. ^[4] Many of the pigs in these facilities regain consciousness at some point in the bleeding process.

An alternative to electrocution is the use of a captive bolt pistol. This killing tool is designed to penetrate the brain but not sever the brain stem. If the brain stem is severed, then the heart would stop pumping blood and the animal would not bleed out as quickly or completely as desired. The pistol is placed firmly against the pig's forehead and fired. A pointed bolt penetrates the brain causing the animal to spasm uncontrollably, and then collapse. The pig is then hung by a chain or cable, and cut from the neck to the abdomen. Again, many pigs regain consciousness during the bleeding process.

Once bleeding is complete, the pig's body is dropped into a tank of scalding water to loosen the coarse hairs. A conveyer periodically turns the carcass as it passes through the tank. The killing line moves so quickly that some of the pigs are still conscious when they are dumped into the scalding tank. According to a USDA swine inspection guide: "A hog that is scalded alive dies from asphyxia and will frequently have a scarlet red appearance and have organs that are engorged with blood." ^[5]

Each year in the U.S. approximately 116 million pigs are slaughtered by this protocol after enduring miserable living conditions. ^[6] Very shortly after birth, they learn that they are helpless in preventing the source of their suffering. Their instincts, keen senses and curious nature are thoroughly suppressed- causing a level of frustration that is beyond comprehension. It is obvious that producers care exclusively about healthy profits. Purchasing these products only serves to reinforce these inherently cruel practices, which no animal should have to endure.

Animal welfare text pieces

1. On many farms and ranches, horses serve as utility or work animals. In the US, 66% of horses are kept for pleasure.
2. Raising animals the way we do at Snake River Farm is a luxury. A luxury financed by you. Most farmers do not have that luxury. They are under ever increasing pressure to produce more with less labor.
3. Bison are wild, which means they are not “domesticated.” Domesticated implies docile and historically “kept by humans.”

Prey animals that normally exist in herds. Prey of course means they are food for relatively large predators.

Four of these five species are ruminating herbivores. Pigs are not herbivores. Ruminates have complex stomachs and can fill all their dietary needs on grass and other vegetation. Pigs are omnivores, and have digestive systems much like ours.

They are mostly herbivorous however. It is estimated that in the wild, meat or animal flesh including insects and worms, makes up only 4% of a hog's diet. That 4% is critical for s in the wild because like us they need protein in their food. On our farm they are exclusively herbivores. Their protein needs are met by feeding them soy bean meal, a vegetative source of protein.

Sheep are normally said to flock but flock is a synonym for herd.

The term “herd” is quite broad in meaning and application.

A horse herd normally consists of a group of 3 to 4 mares and their adolescent young controlled by a stallion. The stallion holds the group together by herding them himself.

A bison herd is a group of 3 to 5 cows with their young, often totaling about 20 animals. This group is extremely cohesive and stays together

Pig, Hog, Swine, Porcine.

Pig is Middle English with possible Low German origin.

Hog is Old English probably Celtic.

Swine is Old English of Low German and Dutch origin.

Porcine is from the French with a Latin root.

They now all mean about the same thing.