THE INTELLECTUAL
EQUINE

Pairing neurochemistry with horsemanship is not entirely what you'd expect to see from respected buckaroo hailing from the Great Basin. Yet, that's exactly what Martin Black does every day in his arena, out on the range or down the road in clinic settings. In the first installment of this *WHR* exclusive, find out why Black's chance meeting with neuroscientist, Dr. Stephen Peters, forged a ground-breaking movement in horsemanship across the globe.

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"Horses don't reason the way we do; we plan for the future, horses look only at the present. Looking to the future is what makes people greedy, storing up more and better. Horses only want comfort at the present time, and respond accordingly."

Martin Black is a fifth-generation rancher and horseman from Bruneu, ID. His family tree has a rich history in the Great Basin that dates back to the early 1860s and consists of chapters of supplying livestock in times of gold booms and to the U.S Army during the Calvary Remount program in the early 1900s. Black began training horses at a young age, using Spanish-California style horsemanship. His experience was garnered from a lifetime of working horses and cattle and working with some of the best horseman in Idaho, Oregon and Nevada, including Tom Dorrance, Ray Hunt, Gene Lewis, Tom Marvel, his grandfather Albert Black and uncle, Paul Black.

Black has always held the vaquero tradition and methods of training horses in high esteem. In old California (the origin of the "vaquero"), the hackamore, followed by the two-rein, followed by the bridle, was the systematic way to a broke and finished horse. This is a tradition that is kept alive by many top horsemen of today and one of the golden rules of the National Reined Cow Horse Association. Likewise, in the Great Basin (eastern Oregon, northern Nevada, north east California, and parts of Idaho and Utah,) the snaffle bit was typically employed first, before the traditional head gear line-up.

To this day, Black continues to use traditional gear because he enjoys learning how to develop more feel and understanding. The man is also an avid advocate of using cow work to train horses.

One of Black's very basic philosophies with horses involves trying to build the horse's confidence at every attempt. He's applied this principle every time he's laid his hands on a colt, or thrown a leg over the saddle – and Black's experience includes starting over 500 colts a year in his early days, ranging from mustangs to starting race horses that would later go to to earn millions on the track. His unique family history and life experience of chasing cattle on the open range prepared Black for a management position on one of the largest ranches in the Great Basin in his early 20s. This lifetime of rich livestock knowledge ultimately prepared Black for the day when he would meet Dr. Stephen Peters, a neuropsychologist, at the 2010 Legacy of Legends.

When the duo met, the two men simply wanted to "talk horses." What they discovered, however, was a revelation the world of horsemanship had been missing.

"I was intrigued when Dr. Peters approached me to discuss the science behind how horses think because I've always enjoyed thinking outside the box with my horses," said Black.

"Pairing science – neurochemistry – with my experience has given me a much greater understanding of the horse."

As Dr. Peters and Black came together, they co-authored Evidence-Based Horsemanship, a concept that combines the understanding of brain function with an empirical understanding of a horse's behaviors, reactions and chemical states.

Dr. Peters has made it his life's work to study the brain. He is a board-certified neuropsychologist with Utah Valley Regional Medical Center. As a neuroscientist and horse brain researcher, he has given numerous presentations and regularly performs horse brain dissections for those eager to learn tangible specifics of equine neuro-anatomy. Back in 2010, he briefly explained to Black about brain function and the fact that brain cells, molecules, neurotransmitters and synapses are almost identical in all animals – except for the fact that when it comes to brain function, the human brain is the most developed of all animals.

Horses have two progressive layers to their brains, while humans have three. The first layer (reptilian, consisting of the brain stem and cerebellum) is concerned with survival, digestion, reproduction, breathing, circulation and the "fight or flight" instinct. The second layer (limbic system) involves emotion and memory and concerns itself with primitive activities related to food, sex and bonding. The second layer also is connected to agreeable and disagreeable experiences. The third and final layer of the brain is the neocortex (or cerebral cortex) and language, speech and writing are all possible in humans because of this layer, which is additionally is the biggest part of the human brain.

The human brain can be compared to the horse's brain as functioning the same at the first two levels. Higher functioning areas of the brain do not exist in horses.

When a horse is born, brainstem pathways begin to mature and develop first. Automatic behaviors and motor patterns of the immature brain are mostly under the brainstem's control and at this point, advanced brain center connections have not yet developed. Next, the cerebellum will mature and develop connections to nerve development – offering the horse coordination and playing a part in its balance, head and eye movements. If you've ever witnessed a foal at play, the quick, jerky movements they make can be attributed to the fact that the cerebellum and its connection are not yet fully developed.

The cerebellum additionally acts as a library for storing all learning regarding the horse's physical movement.

On the subject of a horses' learning ability, both Black and Dr. Peters absolutely believe some horses are better learners than others. Horses that have been exposed to a myriad of life experiences and have had the opportunity to explore solutions and make mistakes are more receptive to learning.

From his time spent working cattle on the open range, Black discovered that cows were one of the best learning tools he could utilize for his horses.

WHO IS MARTIN BLACK?

In the arena, Black has earned the respect of thousands of admirers with his extensive list of show credentials. He has competed in the World's Greatest Horseman Contest, scoring in the top ten in roping, reining and working cow horse go-rounds. The trainer has also earned over $75,000 in stock horse and National Reined Cow Horse Association earnings and several "big league" horses can attribute their success to the gentle start they received from Black's hand. This includes Smart Little Scoot, the all time leading money-earning son of Smart Little Lena, and Pleasantly Perfect, a racehorse who went on to win in excess of $7 million.

Black has additionally contended in saddle bronc, roping and camp drafting competitions. It was only after more than 30 years of cattle being his primary source of income that the horseman decided to make his living working with horses. With his reputation preceding him, before long, Black was traveling across the globe to conduct clinics. Now past age 50, Black continues to start colts, work cattle and compete in western performance events. Between clinics, he spends his time at his ranch in Bruneau, ID.

"I try to keep a balance of what works from the beginning phases, to the high performance end also. At our ranch we operate schools so folks can have an opportunity to come ride with me. I feel blessed to make a living doing what I enjoy and being able to share this with other people who are like-minded."

Horses that have had the opportunity to explore solutions and make mistakes are the better learners, agree both Black and Dr. Peters. These horses have "learned to learn."

Dr. Peters explains that a horse that's exposed to several life experiences has extensive dendritic fields (neuron to neuron connections) in the brain. Hereby increasing the horse's decision making ability and learning capability.

To put that concept into context with horses, consider a horse who has been in a stall most of his life, versus horses that have the opportunity to negotiate varied terrain and live outside – such as mustangs. The stabled horse likely hasn't had the opportunity to gain stimulation from varied environments, negotiate adverse terrain and he may not have a keen sense for herd dynamics. The dendrites in the stalled horse's brain would therefore resemble a pruned tree with few branches, while the dendrite connections in the mustang would look like "a fig bush with a vast network of branches."

Black uses traditional headgear to train horses.

Black refers to these types of horses as "Special Forces Horses."

Although it may have never seen a human, the mustang would be the better learner. It's able to use its expansive dendritic field as a network to utilize past experiences, make new connections, and more easily negotiate new challenges.

Back to the anatomy of the horse's brain. With only two layers, the equine's brain stops short of the massive thinking lobe that a human has. However, what they definitely have in common is the thalamus – an egg-shaped structure located deep in the middle of the brain and at the top of the brainstem so it can process information coming up through the spine and brainstem and send it to its proper location in the brain. Brain message traffic is routed through the thalamus like a major airport through which flights are directed.

Just below the thalamus is the hypothalamus, which acts similar to a thermostat to create a set point or homeostasis. The hypothalamus maintains the horse's physiological and emotional equilibrium and brings the automatic nervous system (ANS) under its control. The ANS governs such functions in the horse as heart rate, breathing, digestion, sweating and chemical secretions. The hypothalamus is a key component in activating the horse's fight or flight response. Fear, aggression, memory, sense of smell and motor functions all have connections that run through the horse's hypothalamus.

It was scientific-based evidence such as this that fascinated Black. "Empirical knowledge"

is verifiable information by observation or experience, rather than theory or pure logic. It's also knowledge one gains by learning through their senses or "feel." Black had an abundance of it with his many years on the range, on the ranch and in the saddle. Dr. Peters specialized in brain functioning by profession. Together, Black and Dr. Peters realized that the public – and their horses – were starving for a source of "real information." Black and white facts. Evidence gathered by observation, tested in the field, free of emotion and validated by science. Using their combined expertise, Black and Dr.

Peters realized current knowledge of the horse and through Evidence-Based Horsemanship, could offer a guide with regards to obtaining the best possible outcomes with horses.

The duo's challenge these days – one that is shared by their calibre of like-minded folk and those who have inherited the task of keeping traditions of the past – is keeping that information relevant for the future. With scientific-based horsemanship, both Black and Dr. Peters may be able to do exactly that. Since 2012, the pair have regularly traveled the world presenting their findings in seminars.