

Roy Jackson: Western Hatmaker

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How Horses Work

Installment #6: Raising the Base of the Neck

by Deb Bennett, Ph.D.

This article builds upon an important lesson taught in the last installment of this series: that collection isn't rooted in anything so superficial as whether the horse's face is vertical, but is instead the result of the horse himself arching the three segments of his spine. Now we're in a position to take a closer look at how the horse uses one of those segments—his neck—to create soft, elastic, and thoroughgoing contact with the bit. The mechanism that allows the horse to raise the base of the neck has puzzled horsemen for centuries, so it might be helpful to begin with....

A Little History

Three hundred years ago, the greatest unsolved puzzle in European horsemanship was how to get the horse to relate correctly to the bit. Educated horsemen of the 17th and 18th centuries expressed this problem in different ways: that the poll was too low—or too high; that the horse was above—or under—or behind—the bit; that he was “going against the hand”; or that the neck—or the shoulders—“lacked to have enough suppleness.” Whatever was amiss, it was elusive and hard to pin down! Whatever it was, it resulted in a horse that was unpleasant to ride and difficult to control.

As rigid Medieval ways of thinking relaxed and the Age of Enlightenment dawned, people sought rational means of understanding how horses work. The first European studies of horse anatomy were published in the late 16th century, which helped to inform horsemanship during the Renaissance. Ancient books of philosophy and wisdom, including that by Xenophon, were rediscovered. People read the works, discussed them, and tried to apply them to all important areas of life, including horsemanship. When in the 17th century Isaac Newton clarified thinking on the laws of physics, it did not take long for some of his discoveries to be applied to horsemanship too.

Rational thinking and a growing awareness of the horse's actual needs, limitations, and capabilities gave birth to a lineage of European riders who utilized a certain body of technique which we now term the Classical High School. It was not “classical” at the time, of course; back then, it was radical, cutting-edge, and practiced by only a tiny minority of wealthy and educated people.

Luckily, it was not a static school confined by doctrine, but

one instead which encouraged innovation. We can look back on it now and see it progress through the written record, beginning even before the printing press arrived in Europe. The first authorities on better riding of which we have record were officers of the Spanish royal army during the reign of Charles V, from 1516 to 1556, who had longstanding connections with the Italian kingdom of Naples. There they seeded the beginnings of Haute École in northern Europe.

The same Spanish officers and noblemen also planted a knowledge of finer horsemanship in the Americas. No modern admirer of the Buckaroo style should forget the contributions of the Spanish, for by the time of the American conquest, Spanish commanders already knew most of what it is needful to know about training horses both for war and for beautiful exhibition, and every movement required in the Grand Prix de Dressage exhibited at the first modern Olympic Games in 1914 was already known to them. Indeed, the first “dressage” exhibition in North America was not given by some Olympic medal winner, nor during a visit to our shores by the Spanish Riding School of Vienna, but rather occurred on the beach at Veracruz, México. The year was 1519; the rider was Pedro de Alvarado, Cortéz' second-in-command, and the purpose was to use the spectacle of a horse/rider that could perform rollbacks, lateral work, sliding stops, and airs above the ground to terrify Aztec tribal leaders.

But I digress; for while the history of American riding progressed on these shores, it continued in parallel fashion across the Atlantic. In Naples, the Spaniards were followed by the Italian Federico Grisone, whose book *The Rules of Riding* was published in 1550. The last of the classical (and the first of the modern) master horsemen, François Baucher, published his book in 1842 (*A Method of Equitation Based on New Principles*).

Between these two lie Antoine de la Baume Pluvinel (1625, *Teaching the King How to Ride a Horse*); William Cavendish, Duke of Newcastle (1658, *New Method of Dressing Horses*); the Baron Reis d'Eisenberg (1727, *Textbook of the Modern High School*); and François Robichon de la Guérinière (1733, *The Practice of Horsemanship*). Today, anyone who wishes can obtain (in English translation, in the form of a facsimile reprint) the books by Pluvinel, Cavendish, la Guérinière, and Baucher. Remember when you look at them that the illustra-

tions in these books were not originally intended to be hung up in little frames to decorate somebody's bathroom (which is where I quite often see them today). The books were intended, like the Haynes Manual for automotive repair, as hands-on, "how-to" technical manuals that were to be followed step-by-step, to the letter.

The Genius of François Baucher

I have outlined this history for one reason: that if you have the time and interest to study any of these authors except Baucher, you will find that although all of them rightly are called master horsemen, still they did not fully understand the functioning of the horse's neck. As a result, even the best of them got inconsistent results—some horses easily got along in their system, while others confounded their best efforts. Then the master, just as though he had little skill or knowledge, would blame the horse—for being badly-conformed, weak in the neck or shoulders or haunches, bad-natured, bad-tempered, badly-bred, or what-have-you. They were only human! Everybody looks for a "rational" explanation when a horse in their care fails to make progress.

Baucher is the exception because, coming last and thus having the advantage not only of his own genius but of a thorough acquaintance with all that had been said and done before, he was at last able to solve the problem of getting horses to collect fully—through the whole spine—and thus to relate correctly and comfortably to the bit.

Baucher's insight was to perceive two crucial facts:

- 1) The horse must not be "braced up" in the poll area (poll, jaws, or tongue)
- 2) Collection is completed when the horse raises the BASE of the neck—not the poll

This is not to imply that Baucher had expertise in the area of anatomy and biomechanics. It took another century before the Dutch zoologist E.J. Sleijper and the American paleontologist Remington Kellogg were able to clarify how this odd potential of the neck, which is termed in my own books the "neck telescoping gesture," could occur. I do insist that Baucher be credited, however, because he got—by feel alone—the right idea, developed techniques to effectively get horses to do it, and was able to teach his students how to help any horse comfortably achieve and maintain collection by raising the base of its neck.

Before we go on to look at the anatomical and biomechanical details, only a little more about history need be said. First, to properly credit Baucher for being the ultimate inventor of "head twirling"—his version of this, adapted to iron-jawed French Army horses that had for years been ridden in double bridles, he calls "jaw flexions." Baucher later took this even further. He became aware that a horse can have released through the poll and jaws, yet still be holding a brace in his tongue—which is actually a large muscle; for which head-twirling, or jaw flexions if you like, is once again the direct antidote.

From the first moment Baucher set pen to paper, his writings have been hotly debated in Europe. I believe this to be primarily because even native French speakers have a hard time understanding what he meant. Baucher had a tendency to use his own terminology for things, or, finding no appropriate term, for "bending" existing words into meanings that only he and his disciples understood. There absolutely is a parallel here between Baucher's writings and those of Tom Dorrance, and it arises in both cases because there is no human language that is really suitable for or capable of conveying things that those who have had a vision of Heaven have seen, felt, and learned during that experience. I however am of the belief that when peoples' intentions and point of view are attuned, they will under-

How Does It Feel?

Because it is vitally important that the rider have a clear idea of what he is asking of his horse, this is an exercise I teach to every group of riding students. By doing it yourself, you will have the opportunity to experience what it feels like to your horse when he raises the base of his neck.

Sit on a bench or wooden chair, balanced and relaxed, and feel equal weight upon your seat-bones. Have both hands palm-up in your lap. Relax your shoulders and make sure you're not holding one or both of them up in a perpetual "shrug."

Now reach up to touch the top of your head. There is a certain zone where you will be aware that there is more "feel"—the so-called "crown chakra." This point will be on the midline of your head, and located rather closer to the back than to the front. Touch this point briefly to make yourself aware of it, then return your hand to your lap.

Next, imagine that you have a big, warm, sticky ball of pink bubblegum as big as a golf ball stuck atop that very spot.

Now—make whatever effort it would take to lengthen your neck enough to stick that blob of bubblegum to the ceiling. Of course the ceiling is a long way up there and you won't really be able to reach it, but you can try!

If you make the correct effort, your chin will automatically drop. If you feel your chin straining upward, you've got your bubblegum too close to your forehead. Reposition it farther back. You should feel the back of your head "leading" as you stretch upward.

The back of your head is the human equivalent of the horse's poll, and we want him to move in the same way the bubblegum exercise causes you to move: by leading with the poll, pushing forward-and-up. The poll "leads" because of the lifting effort of muscles located deep in the base of the neck.

How different this feels and functions than if I had merely told you to raise your head by pulling your "poll" back! If you want an idea of the discomfort it causes the horse when a rider attempts to obtain collection by pulling back on the reins, first pull your poll back and let your chin rise. Now, making the effort to hold your poll back, simultaneously try to tuck your chin. (Important: Don't do this for long, and don't do it at all if you have pre-existing problems with your neck.) Feel how this wrong effort cramps your tongue, narrows your airway, and causes joint and muscle pain in your neck. Now you never need to do that again I hope!



stand each other. To this end I have produced my own “vernacular” translation of Baucher’s original book, which anyone interested may obtain through the Equine Studies Institute website.

Modeling Neck Function

Model-building is a useful technique for understanding the essential components of complex body systems. Figs. 1 and 2 show, in simplified form, how a horse raises the base of the neck. The same model works as well for humans as it does for horses; read the accompanying sidebar to learn an exercise that will let you experience how raising the base of the neck feels to your horse. When you get the feel of it and thus know for certain what you are asking the horse to do, you’ll find that suddenly it starts happening “all by itself”!

The neck bones of the horse are arranged in an “S” shape. In conformation study, we call the upper bend of the “S” the “turnover” and the lower bend the “base.” The base is formed as a dip that is more or less deep depending upon the length of the last several cervical vertebrae.

Muscles make the skeleton move. An important law of physiology says that, when a muscle is stimulated, it can have but one response, and that is to contract: to get shorter from end to end. This seems obvious, but how often we hear statements that reveal that the speaker is thinking just the opposite! For example, “the bulging muscles on the front of a horse’s neck account for him being high-headed. The thick muscles are pushing his chin up.” As Baucher would have said—trés impossible!

So what does account for the bulging “elk neck” of the horse in Fig. 3A? If muscles can only contract, how can any body make a motion akin to punching, which moves the fist away from the chest? How can the boxer’s jab or the mule’s kick possibly be the result of muscles getting shorter? Outward punching or kicking actions are not due to muscles actively lengthening—because muscles cannot actively lengthen. They occur instead because of the way muscles are attached to the skeleton: normally, in relation to joints—which create leverage. From this point of view, the whole skeleton is nothing but a collection of levers. Even cave-men knew that a lever is a machine that converts a pull into a push. Alley Oop puts a rock on the low end of a teeter-totter and then walks around to the high end and pulls down, lifting the rock. Input a pull; output a push. In the body, muscle contraction inputs the pull, the leverage is provided by the swivelling of a joint, and the output is a punch or kick.

The Neck-Telescoping Gesture

When a horse raises the base of the neck, he makes a coordinated effort which involves contracting certain muscles while maintaining the relaxation of others. Two conditions,

therefore, will prevent a horse from being able to raise the base of his neck: either that he fails to contract with enough effort the muscles which are in a position to lift it, or that when he does contract them he also contracts muscles which ought to remain relaxed. Backward or downward traction upon the reins which exceeds the strength of the horse’s own neck-lifting effort blocks the very result that the rider who pulls probably wants. Hanging on the reins—especially pulling downward—is always a mistake!

Because tiedowns, running reins, and running martingales exert an effectively downward force, they are very efficient at producing all kinds of wrong results. While raising the base of the neck is an inbuilt capability of all equines, the longus colli muscle that lifts the base of the neck (Fig. 1) has much less leverage, and can exert much less power, than the cervical rhomboideus and splenius muscles that act to raise the head and pull it back. Tight reins, or any device that pulls a horse’s head back multiplies the effect of these muscles, utterly blocking the horse’s attempts to carry his neck arched from the base. In short, it is easy for a horse to raise the poll and drop and “ewe” the base of his neck, and much more difficult to do the opposite, especially with a rider on his back. It’s our job to learn how to help instead of hinder him!

As the biomechanical model (Figs. 1 and 2) shows, a horse’s neck is a lever system in which the pull of muscles is normally “input” in a somewhat unusual way: from below, as if the longus colli muscle were a hammock slung under the dip in the base of the neck. The weight of the horse’s head and the upper part of the neck, stacked as they are upon the base, is like a man standing in a hammock made of muscle. When the muscle contracts, the hammock simultaneously lifts the base of the neck and shoots the poll upward and forward to create the “neck telescoping gesture.” It is this gesture which carries the horse’s head, and with it the bit, softly to the rider’s hand. It cannot be other than “softly” because the horse cannot make the gesture at all if any muscle in his neck is braced.

The neck-telescoping gesture and arching the neck are two names for the same thing. As we learned in the last installment, the higher the upward arch in the chain of vertebrae, the higher the degree of collection. But because the neck is free at the head end, its action is a combination of upward and forward movement, and there can be any combination of the two. Excited horses at liberty often arch their necks so that the neck is extended forward more than the poll is raised; in this case, the nostrils are usually carried lower than the withers. But it is possible also for a horse to arch his neck and yet also raise the poll very high (Fig. 3B). To produce this gesture under saddle requires strengthening the longus colli muscle. This is done through “going long and low” or “showing the horse the way to the ground” (Fig. 4B)—an old, wise exercise that imitates the elastic nostrils-below-withers movement of a horse at lib-

Modeling the Neck-Telescoping Gesture

Biomechanical models are simplifications of reality that help us learn how a system functions.

Figure 1. This series teaches the difference between actively raising and actively dropping the base of the neck.

View A represents the neck in a “neutral” resting position—the basis of comparison. Muscles are drawn in with stripes; they are tissues that get shorter from end to end when stimulated. Light gray tone represents the cordlike part of the nuchal ligament, which cannot contract but which can be stretched when something else pulls on it, such as the contraction of a muscle or a pull by the rider’s hand.

View B shows raising the base of the neck. The basal joint moves up, pushing the poll forward and ultimately downward, as shown by the arrow. Note that the fore part of the thorax is raised too; as a result, the withers rise relative to the shoulder blades. Stripes indicate the longus colli muscle actively contracting, while medium-gray tone indicates muscles that are passively “switched off.” Note that muscles that are passively switched off get stretched along with the nuchal ligament, shown in light gray.

View C shows the opposite action—dropping the base of the neck. Now the splenius and cervical rhomboideus muscles are active (striped). Their contraction shortens the distance between the poll and the withers, slacks the nuchal ligament, and stretches the longus colli muscle. The withers sink between the shoulder blades.

Figure 1.

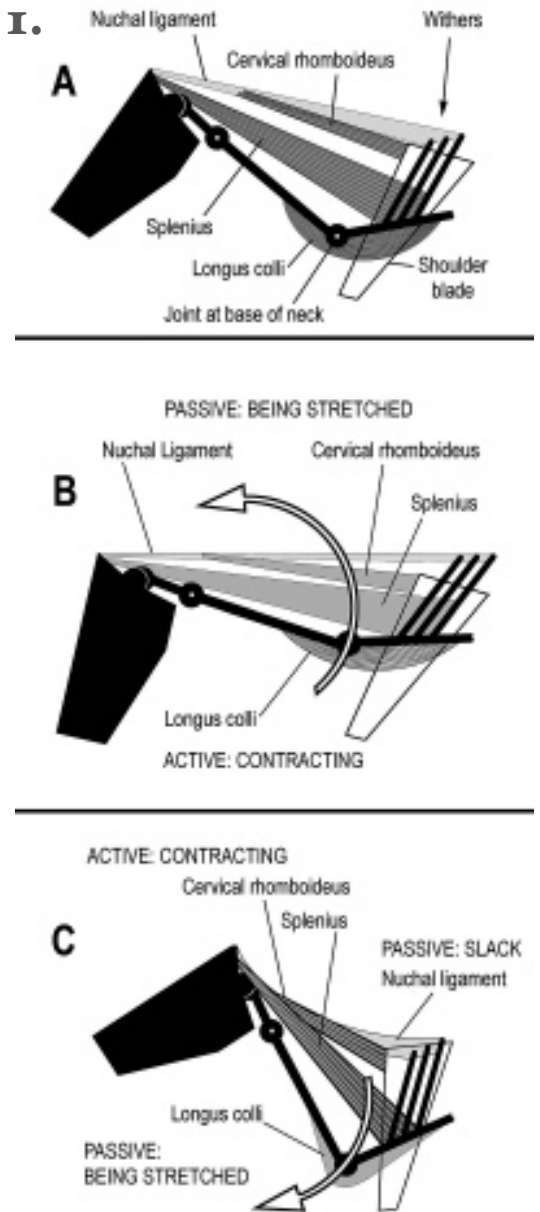


Figure 2.

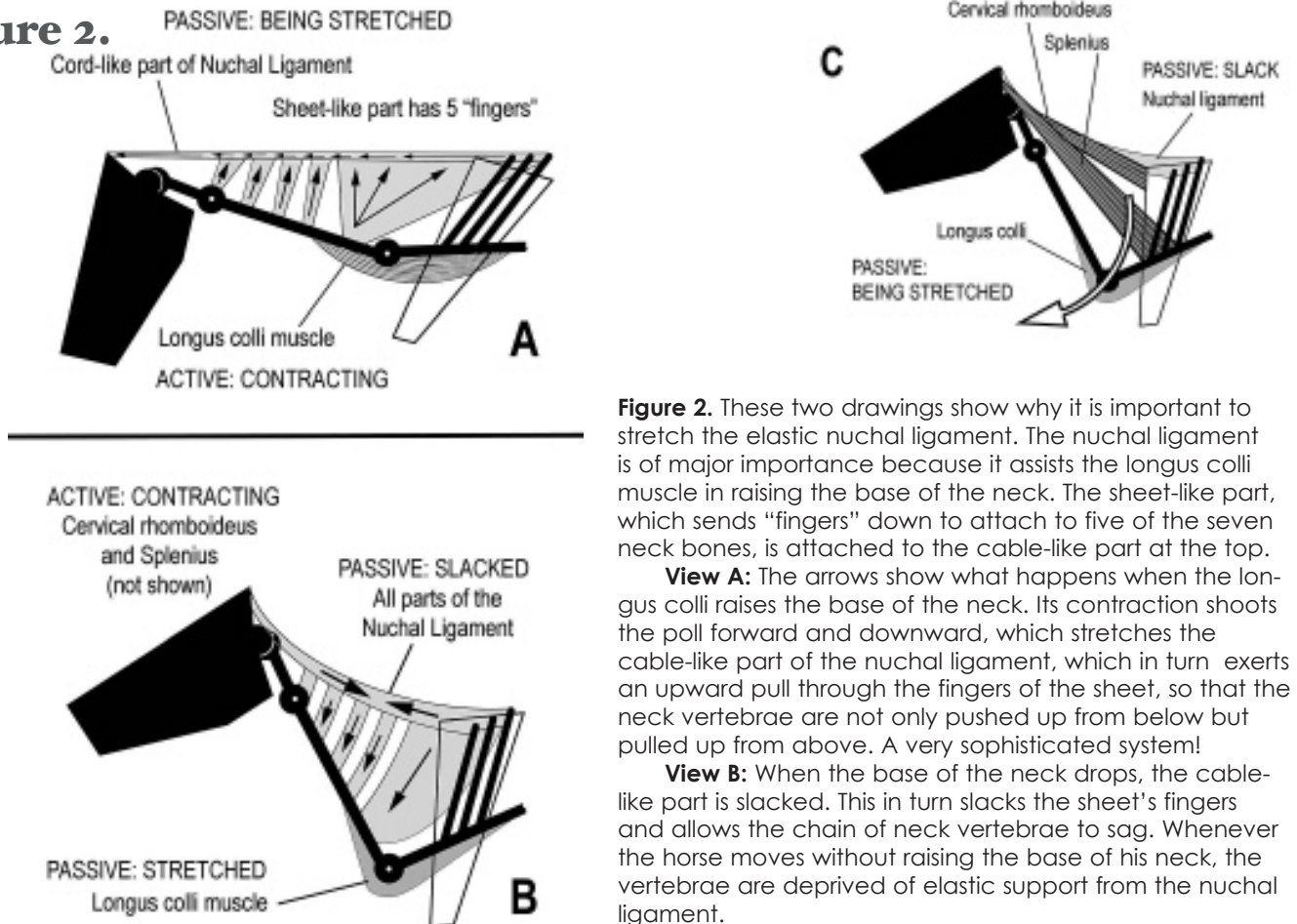


Figure 2. These two drawings show why it is important to stretch the elastic nuchal ligament. The nuchal ligament is of major importance because it assists the longus colli muscle in raising the base of the neck. The sheet-like part, which sends “fingers” down to attach to five of the seven neck bones, is attached to the cable-like part at the top.

View A: The arrows show what happens when the longus colli raises the base of the neck. Its contraction shoots the poll forward and downward, which stretches the cable-like part of the nuchal ligament, which in turn exerts an upward pull through the fingers of the sheet, so that the neck vertebrae are not only pushed up from below but pulled up from above. A very sophisticated system!

View B: When the base of the neck drops, the cable-like part is slacked. This in turn slacks the sheet’s fingers and allows the chain of neck vertebrae to sag. Whenever the horse moves without raising the base of his neck, the vertebrae are deprived of elastic support from the nuchal ligament.



How Horses Work

erty. It is not about merely getting the horse to lower its head, but to lower it as a result of the horse making the effort to raise the base of the neck.

A good rule of thumb in training: the horse must never be asked to raise his poll higher than he can support without dropping the base of his neck. That's what's wrong in Fig. 3A: the rider's hands exert continuous backward traction on the reins, blocking any effort the horse might have made to raise the base of the neck—indeed actually driving the base downward. The poll is quite high, but the neck is “hollow” with the vertebral chain thrown forward rather than arched. It is the mis-positioning of the neck bones, rather than any contraction of the muscles on the front of the neck, that creates the bulging “elk neck.”

The fitness of the longus colli muscle that underspans the base of the neck is an exact caliber of a horse's level of training. If you try raising your horse's poll and you feel or see the base sinking, or if the front of the neck starts to bulge forward, then you're asking too much; you're asking the horse to do something he cannot yet do comfortably from the sole of

the contacting hind hoof all the way through to the tip of his nose.

This raises one final important point: raising the base of the neck never occurs, and should not be considered, in isolation from what the horse's hindquarters are doing. I focus on the front end of the system here because it's easiest to learn the functioning of the whole body by considering one section at a time. Nonetheless raising the base of the neck in the living horse is always accompanied and assisted by coiling of the loins which rounds the freespan of the back, bends the joints of the hind legs, and lowers the haunches—just as we saw in last month's installment.

Even a horse built considerably “downhill” or one with a real “ewe neck” can achieve high collection if he coils the loins and “sits down behind” enough. Yet neither this nor raising the base of the neck can occur when there is worry, confusion, discomfort, distraction, resentment, or tension in the horse: for just as the ancient Xenophon said, no riding can be beautiful if it is compelled.

Next installment: Pulling Through a Brace

Figure 3. Both of these images have been carefully reproduced from photographs, and there's special value in the fact that both horses are American Saddlebreds. Even those of you who ride other breeds, or who might never ask a horse to collect as high as the horse in View B, will find there's something to learn here.

View A: A perfect example of “elk neck.” The horse's body is tense and rigid all along the spine. It is hollow in the back. It is “above the bit.” It is “on the forehead.” It is out of rhythm, able to produce neither a correct trot nor a correct rack. Notice how shrunken—how unattractive—how trivial this horse's globally incorrect movement makes him look compared to B.

View B: From a 1950's-vintage photo of the great Hungarian horseman Arthur “Pop” Konyot up on a magnificent stallion called The Kentucky Colonel. This is the highest CORRECT poll position I ever saw any horse produce. What makes it correct? Several factors:

1. There is no brace anywhere in the horse.
2. The loins are coiled.
3. The horse deeply flexes the stifle and hock joints, causing him to lower the haunches relative to the withers.
4. The freespan of the back is high and full.
5. The horse makes a powerful effort to raise the base of the neck.
6. As a result of that effort, the midsection of the neck and the poll, which are stacked upon the base, are pushed upward.
7. Konyot makes zero effort to pull the horse's head, poll, or nose back. Notice how he fingers the reins -- almost like someone playing a harp, he plays the horse, using the individual reins to “talk” to him.
8. Konyot is not asking the horse to “tuck” – the head falls as vertical as it does simply because there is no brace in the horse. In a stallion like this one, that is built with enormous space behind the jaws and flexibility at the poll joint, when there is no brace there is nothing to prevent the head from hanging nearly straight down.

Notice the Colonel's gait – this is a picture of a horse executing a passage, a high-stepping, elastic trot. The animal is so highly collected and his movement so vigorous that the passage exceeds what is usually seen at the Olympics, verging on being a Spanish Trot or “stretch passage”. The camera snapped right at

Figure 3.

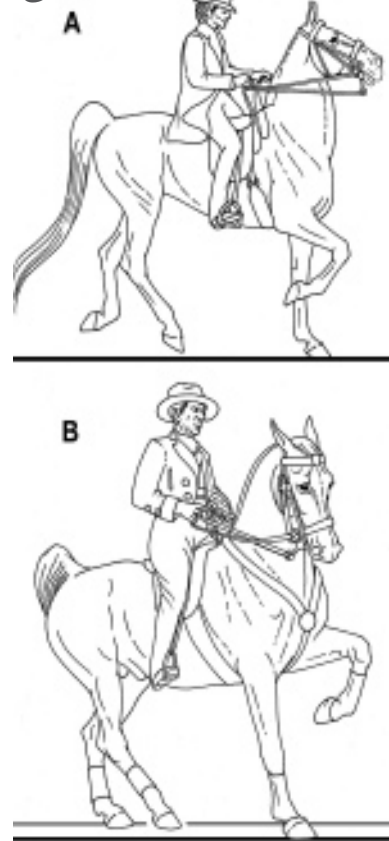


Figure 4. A



the beginning of an "upward" cycle – right hind and left fore are both still rising. The stallion has such high action in front, and he is sitting down so much behind, that the hind foot will not rise as high as the forefoot, and will achieve its highest point a fraction of a second later in each cycle than the forefoot. Many an over-critical "dressage judge" has looked at this photo and not understood the springiness and the joy it records – I feel sorry for them!

Figure 4. "Showing the horse the way to the ground" is an old and important exercise. Anyone who hopes to develop a horse to the point where he can carry a rider in collection needs to learn to distinguish between the real McCoy and imitations of this exercise which are of no physiotherapeutic benefit and which may over the long term actually prove harmful.

View A: There's no denying that this horse's head is lowered and extended out from the body, but doing it this way accomplishes nothing. He has very little life in the body -- so little that the gait degenerates from the slow, elastic, and collected trot that is the real Western jog, into a wooden "stepping trot" in which the horse swings its legs while barely bending its knees, hocks, or stifles. True collection is absolutely impossible unless the horse's back swings, the loins coil, and the hind joints flex open and closed. Because this horse is faking collection, the base of his neck actually sags.

View B: This is the correct way. Those of you who ride in Western tack will have little difficulty picturing this pair decked out that way – when it's done right, the exercise works the same in any style of tack. Notice that while this mare does not rush, she has enough life to produce a trot that is elastic and suspended. All her joints bend; her loins coil; her back oscillates in the normal manner, up and down and from side to side. The rider initiates the exercise by tapping or lightly squeezing with the calves of her legs in time with the stride – one tap about every three strides. This induces the horse to make more effort with the "core" muscles and thus to raise its back and the base of its neck as it moves. Expecting this response, the rider is ready to open her elbows and push her hands forward so as to permit the horse's head and neck to telescope forward-and-down. If her arms aren't as long as the stretch of the horse's neck, she will even permit the reins to slide through her fingers like a fisherman playing a big fish that has caught the hook and is swimming directly away. The rider will not, however, at any time let either her hands or her reins get ahead of the horse so as to lose the feel of its tongue. Many-time World Champion and Olympic gold-medalist Reiner Klimke used to say: "90% of horses need to be ridden this way 90% of the time."

View C: This rider is not doing too bad of a job, and I'm glad to see the base of the neck strongly raised and the head lowered and extended without the muzzle being pulled back. Nonetheless I am tempted to ask this rider why she is in such a hurry. To "show the horse the way to the ground" in such a manner as to be of physical benefit, there is no need to push him beyond the level of effort necessary to produce a pleasantly elastic trot. It is never wise or necessary to ask a horse to "track up." Notice how pushing a green horse to do this creates interference, because the animal really is not strong enough to elevate or lighten the forequarter sufficiently to guarantee that the contacting forefoot will have been lifted off the ground before the hind foot arrives. Because a horse just hates stepping on his own heels, pushing him to "track up" merely teaches the intelligent animal to twist his hindquarters off to one side slightly – in other words to adopt the habit of going crooked -- just as you see here.

View D: This approach is just as incorrect, useless, and potentially harmful as A. The horse presents a big front but it's all a fake; there's almost no weight upon the hindquarters. Schooling in this manner hurts the ligaments of the topline by overstretching them, while simultaneously failing to address the "core" muscles that, we have learned, actually empower collection.

Compare this view to Konyot and The Colonel!

