GENE FREEZE:
ARE YOUR HORSE'S FEET CORRECTLY BALANCED?

Probably not, according to the noted farrier, who models his easy-to apply system for spotting and correcting lameness-causing imbalances on the wear patterns of horses in the wild.

AS TOLD TO SUSAN HARRIS

Since you're already trying to take the best possible care of your horse's feet -- you have the best farrier you can find attend him on a regular schedule; perhaps you even pay extra for corrective trimming or shoeing to be sure your horses feet are 'in balance' -- your horse ***should*** move and function at his best. But the odds are overwhelmingly against it.

The sad fact is that almost every domestic horse is at risk, if not actually in pain, from the way we customarily shoe, trim, and 'balance' horses feet today. Our horses wear out and break down prematurely; how many horses can you think of that reach their teens without a splint, spavin, ringbone, navicular disease, or arthritic joints? We see horses crippled or lost with fractures caused by a bad step -- but how many times was the bad step caused by a foot trimmed or shod in such a way that distorted the natural balance of the foot? Its harder to count the cost in horses that simply never perform up to their potential because they are handicapped -- enough to hurt their ability to move well but not enough to produce obvious lameness. Dr Bill Moyer, a veterinarian who has studied lameness problems extensively, believes that nearly all horses live in some degree of pain constantly -- because of the ways we insist on altering their natural conformation and balance. Much of the equine drug abuse problem plaguing the horse industry today could disappear overnight if we learned to trim and shoe our horses so that they could move naturally and in comfort.

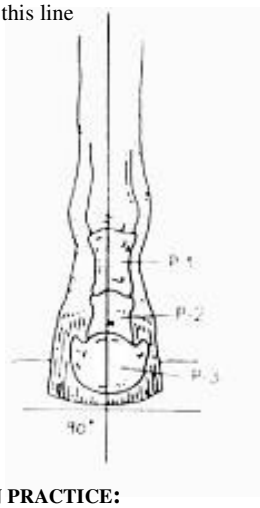
Don't be too quick to blame your farrier for all your horse's troubles. While he's the man with the rasp, and in most cases he is the one, who can help – or – hurt -- your horse the most, he's undoubtedly trying to get your horses feet in balance the best way he knows. If he's experienced and well-trained, he probably tries to do a meticulous, quality job of shoeing and trimming, and he wants your horse to move well as much as you do. The trouble is that the conventional method of balancing feet used by most farriers and taught in most farrier schools is more likely to produce a cosmetic job of balancing the feet than a functional one. It makes a foot and leg ***appear*** to be better balanced -- but, for all but a few horses, it may actually throw the hoof out of its natural shape and balance. It's based on a straight-line theory that would work just fine if all horses legs were straight and symmetrical but that falls apart when applied to most horses' natural -- and imperfect -- legs and feet.

TRADITIONAL METHOD

Conventional wisdom regarding hoof balance is based on the ideal: the perfectly straight-legged horse we all wish we owned. Farriers are taught to imagine a vertical line drawn down the centre of the pastern and hoof, with a horizontal line drawn perpendicular to it at the ground surface of the hoof. By trimming away the hoof that extends beyond this horizontal line, the theory goes the hoof is made to land flat and brought into 'balance'. This also tends to make a crooked leg appear more nearly straight. This method works fine for the perfectly straight leg, in which a vertical line would fall right down the centre of the pastern and foot. However what it fails to take into account is that horses aren't made with perfectly straight legs, particularly from the fetlock joint down. And

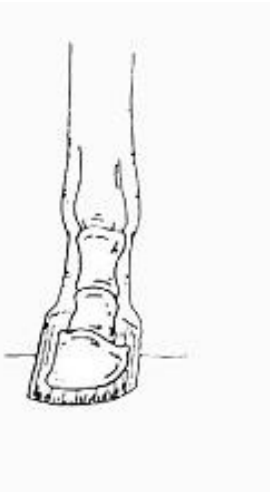
CONVENTIONAL METHOD OF TRIMMING FEET – AND ITS SHORTCOMINGS

THE THEORY:
A vertical line should bisect canon, ankle, pastern, and hoof. The ground surface appears to be perpendicular to this line



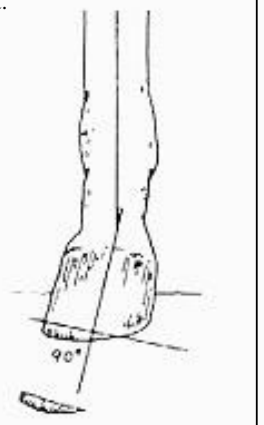
IN PRACTICE:
In this leg the bones line up perfectly straight naturally (which is very rare in real life). The theory is correct if the leg is naturally straight and perfect.

A crooked leg which is 'out of balance' according to conventional theory



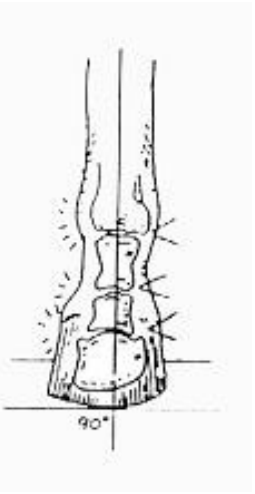
In this leg the bones are aligned naturally, but the leg is crooked especially where P-2 and P-3 meet. The leg is actually correctly balanced for this horse conformation.

According to conventional theory, to 'correct' the foot, a line is drawn down the centre of the pastern, with another line perpendicular to it. The 'extra' hoof is trimmed off to 'balance the foot.



The balance of the foot is altered by removing a slice of the wall from one side of the foot.

Result, leg looks straighter and appears to be in 'balance' when seen from the front.



But the shape of the bones doesn't change so trimming one side disarticulates the bones. Result a leg that looks straight but is out of alignment causing stress and pain and risking injury on naturally crooked legs.

REMMBER: don't confuse straightness with alignment of bones!

you can't draw a straight vertical line down the middle of a crooked leg.

Most horses, just like most people, vary from the ideal. The perfectly proportioned human, our gym teachers used to tell us, should have the 'Indian walk'; his toes should point straight ahead as he lands evenly on the weight-bearing surfaces of his feet. But most of us ordinary mortals toe out to some extent; some of us are pigeon-toed; and only a few naturally toe straight ahead. Yet, despite our less-than perfect conformation some of us become world-class athletes.

But how well would a human decathlon competitor perform if he were equipped with shoes that tilted the weight-bearing surface of his feet and forced his feet to conform to the straight-ahead angle. Just try walking for five minutes on the outside edges of your feet, or jumping down off a low step or chair and landing on the outside edges of your soles. Now imagine that you weigh a thousand pounds and must carry the weight of a rider as you land from a jump or come down on a single foreleg at every stride of a gallop. Can you picture the stress on bones; ligaments and joints that a horse lives with when you 'correct' his natural foot and leg structure to conform with the way we think it should look?

SHOEING ACCORDING TO CONFORMATION

There is a way to balance your horse's feet comfortably and correctly for his own unique conformation and natural way of going. It's not difficult to learn or to apply, but you will have to learn to look at your horse's feet from a different viewpoint in order to see and evaluate the natural shape and angles of his structure. What may be more difficult, for some people, is to accept the horse the way he is made. You simply cannot change his natural basic structure and way of moving very much without making

him pay the price -- in discomfort, stress, and eventual breakdown***. (Of course, it is possible to change the structure of a horses foot and leg if you trim him correctively while the foot and leg bones are still growing -- up to about eighteen to twenty-four months of age. This article is concerned with the mature horse that is past the point at which you can make such changes in his bone structure.)***

It took more than fifty million years of evolution to develop the mechanism of the horse foot and leg. Under truly natural conditions, this mechanism functions extremely well. A study of more than five thousand mustangs living on harsh, rocky terrain such as the Pryor mountain range in Utah found virtually no cases of splints, spavins, ringbone, sidebone, navicular disease, or other assorted plagues of domestic horses feet. Horses that had spent fifteen years running over lava rock and sand, travelling thirty miles from one water hole to the next, and existing on the poorest feed, were clean-legged and sound. But within a year of captivity, after being broken to ride, kept in confinement, and trimmed and shod, some of these same horses were showing signs of the common foot and leg problems that affect so many pleasure and performance horses. Somehow, the benefits of civilisation were no benefit to them.

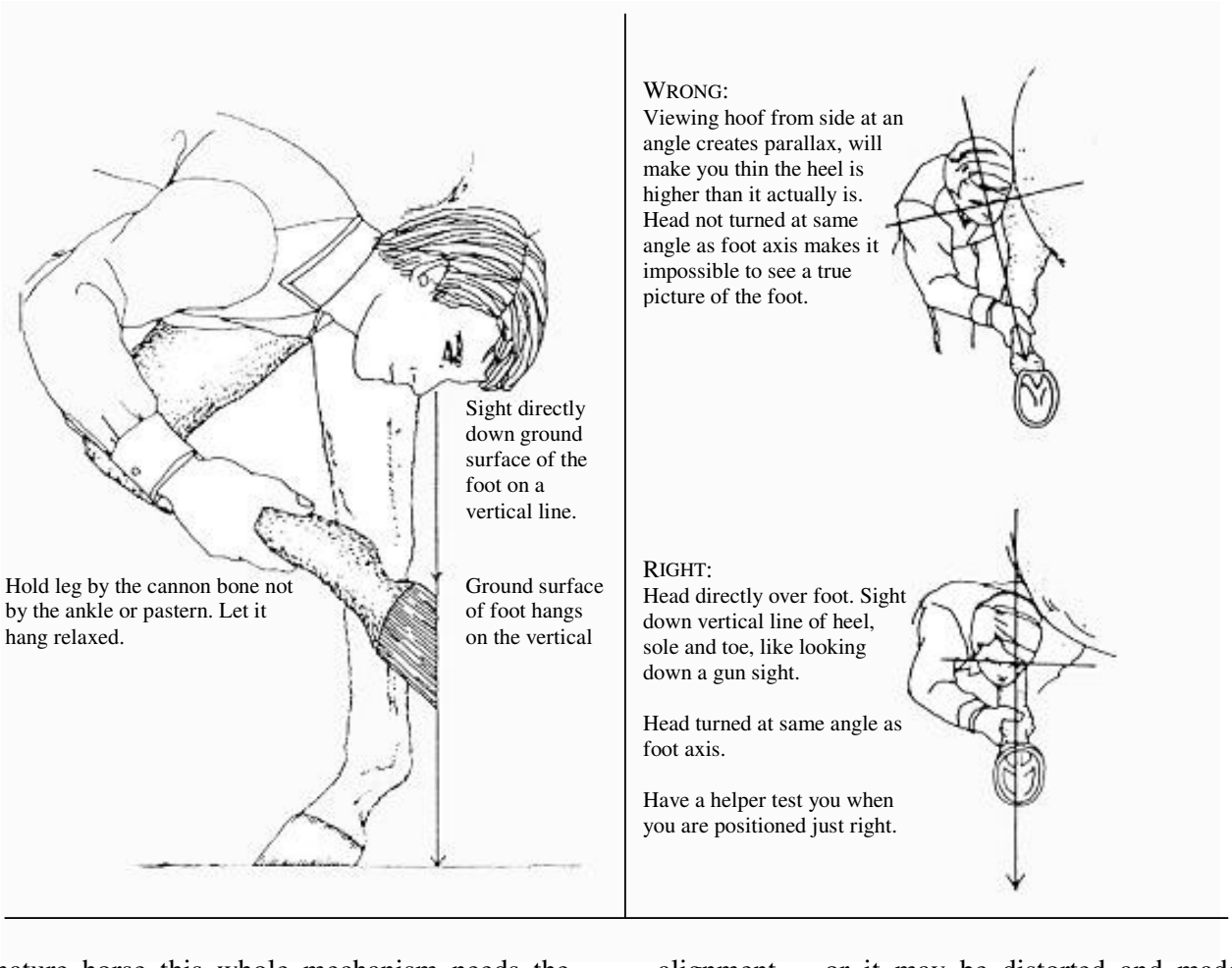
A mustangs hoof is a truly natural hoof: one shaped the way nature and the individual horses conformation dictate, by constant movement over rugged terrain, without the human intervention of shoeing or trimming. Mustang feet aren't very pretty or correct by halter-class standards. They look irregular and worn off at the toe, and crooked lags are more the rule than the exception. Yet wild horses stay sound and functional under conditions that would quickly cripple the average pampered pleasure horse, until man captures them and begins to 'help' nature with rasp, shoeing, and artificial life-style. Then they fare no better or worse than horses raised in captivity.

Unless your horses are turned out on five thousand acres of open range, chances are you've never seen a truly natural foot -- and your farrier may not have, either. Getting underneath a wild mustang to examine his feet can be a hair-raising experience: in the study I conducted with Dr Michael Kirk, the captured horses had to be sedated and immobilised before we could safely manipulate and study their feet. A domestic horse turned out in a forty-acre pasture (or a four-acre turnout paddock) may not wear his feet down into a truly natural pattern, because he doesn't travel the great distances over rough terrain that a wild horse does. Besides, he starts out with a hoof that has been altered by shoeing, trimming, and the limited exercise imposed by his civilised life-style. Even if you turned your horse out barefooted on the open range, it would take many months for his feet to wear to the shape that nature intended -- and he might not survive that long! You can't transform your horse's feet into mustang feet, but you can learn from those tough little survivors how a naturally balanced foot should look. The closer you can come to the way your horse would wear his feet naturally, the better your horse will be able to move and perform in such civilised pursuits as dressage, reining, jumping, pleasure, and racing.

The hoof is the base of support for the leg -- at times, for the entire weight of the horse. It is built around the coffin bone, or third phalanx. (***Lets refer to the three phalanges, or long pastern bone, short pastern bone, and coffin bone -- as P-1, P-2, and P-3 respectively.***) The articulation of P-1, P-2, and P-3 is very critical: there is less than 1/32 inch of clearance between the bone surfaces. These bones are shaped to fit each other exactly: any change in the shape of the hoof that alters the natural Angle of P-3 causes some disarticulation, or distortion, of the way the bones meet each other.

At every stride, the bones of the lower leg move into a 'close-packed' position in preparation for hitting the ground. If the foot is in balance, the mechanism works smoothly, with each part of every bone and joint surface bearing its share of the load and the 'load-levelling' mechanism helping to absorb shock and stabilise the hoof. (***'Load-levelling' results from the ability of the coffin bone to move a little from side to side in order to handle landing on uneven ground. When a foot is out of balance, the coffin bone moves as far as it can go. A little extra stress, such as a bad step or landing on uneven ground, can be enough to cause a break.)*** Its important to remember that in a

HOW TO VIEW THE FOOT



mature horse this whole mechanism needs the bones aligned naturally -- crooked or straight, according to that horses conformation and the way those bones are shaped -- in order to function normally. When the hoof is shaped so that it provides a correct base for the bones of the leg and allows P-1, P-2, and P-3 to line up normally for that horses conformation, the hoof is in balance. If the hoof -- and consequently the whole base of the leg -- is tilted or changed so that the bones are out of their natural alignment, the hoof is out of balance.

It's important not to confuse ***straightness*** with ***alignment***. A leg that appears straight may have the bones correctly and naturally aligned, or it may have been made to look straight even though the bones are out of alignment. (***This amounts to a time bomb for the soundness of the horse involved!)*** A leg that appears crooked may be naturally balanced -- with the bones in alignment -- or it may be distorted and made more crooked by being out of balance. ***Straightness*** in itself is only desirable if the bones line up straight -- which is rare in the real world. ***Alignment*** is always critical: any time you force a horses bones out of alignment -- even for the sake of straightness -- you make him hurt and endanger his soundness. Its not worth the risk to the horse to throw him out of balance in order to make his legs appear straight if he isn't naturally built that way, and it will never make him a better performer.

When a foot is out of balance, it lands first on the 'high' side -- the part that projects the most toward the ground, putting extra stress on the load-levelling mechanism, perhaps enough to cause a sprained or torn ligament. If the ground is hard, the uneven shock may drive upward like a chisel, hammering against one end of a pastern or cannon bone with enough force to fracture it.

Or the constant wear of slightly disarticulated joints can produce inflammation, erosion of cartilage, and calcium deposits that eventually show up as ringbone, sidebone, arthritis and the like. Masking the pain with drugs and continuing to work the horse on out-of-balance feet can only aggravate the trouble and lead to still worse consequences for him.

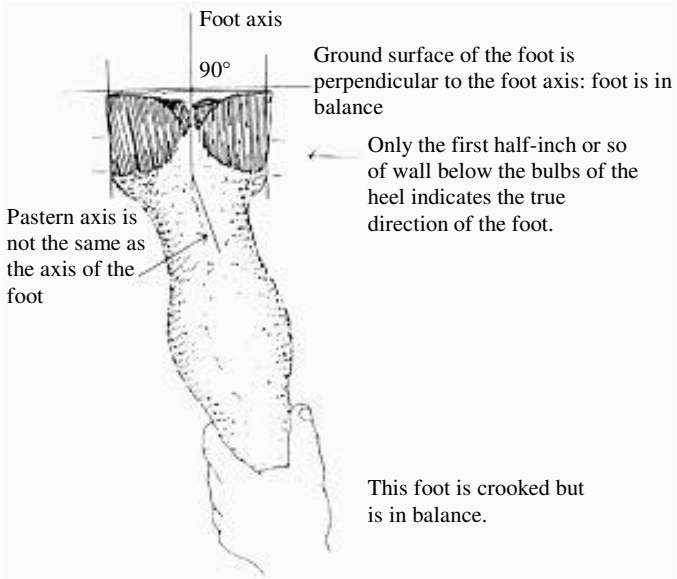
EVALUATING LATERAL BALANCE

You want your horses feet balanced correctly, but how do you recognise what is correct? The best answer is to go back to nature and take a look at the way the horse wears his feet when he hasn't been interfered with by shoeing, trimming, and the artificial life-style we impose on him.

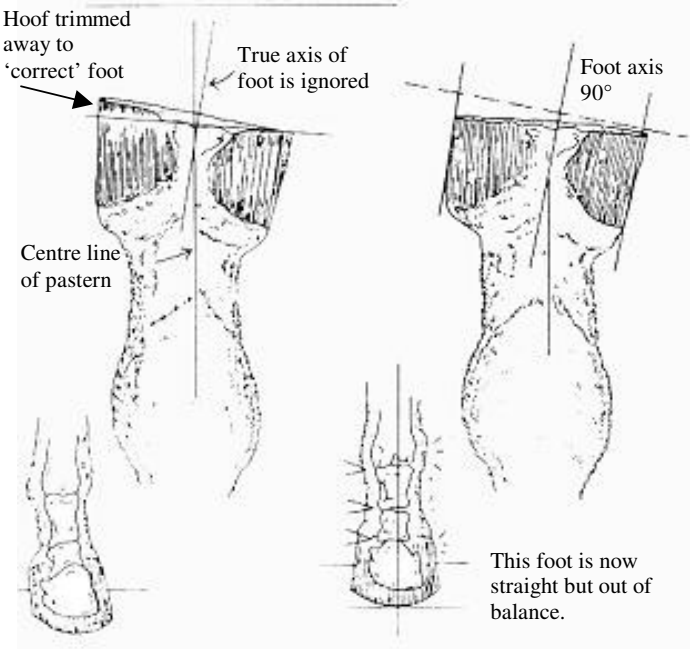
In order to tell whether your horse's foot is balanced, you must learn to find the natural direction or axis of the foot, which corresponds to the direction of P-3. This may not always conform to the ideal (perfectly straight) conformation, and you can be misled by distortions caused by a foot that has been trimmed or shod out of balance for a long time, and most domestic horses are out of balance. The hoof is plastic – flexible -- and, like any plastic material, it is subject to a 'creep factor': it will slowly distort and change its shape in response to pressure. So, when you look at a horse's foot, you must see through the distortion to find the true axis of his foot and coffin bone.

I'm going to give you a method for determining whether your horse's feet are in balance. Many farriers arrive at their evaluations by watching the horse move, usually coming toward them. But, since the foot lands from rear to front, when you watch from the front the hoof blocks your view of the heels and frog and you cant really see how it lands. Even if you watch from the rear, you will be looking down at the foot -- no matter how low to the ground you position yourself -- and so you can never get a really undistorted view of how the foot meets the ground. My method concentrates on the foot held off the ground in a natural, relaxed position. Its permits a true view of the bearing surface of the foot: and, because the relationships of the bones are undistorted by the weight of the horse, it gives a clearer picture of the underlying conformation.

The illustrations on this page show the evaluation procedure for a front leg: the process is the same for a hind foot. The method works whether the horse is shod or barefooted. Here's how to do it.



CONVENTIONAL METHOD OF TRIMMING, WHEN APPLIED TO A CROOKED BUT NATURALLY BALANCED FOOT THROWS THE FOOT OUT OF BALANCE AND PUTS THE BONES OUT OF ALIGNMENT.



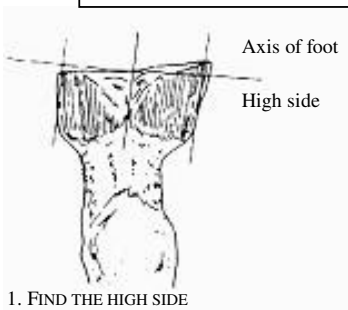
1. Pick up your horse's foot normally, but hold it by the cannon bone above the fetlock joint, instead of the way you would hold it for cleaning. Let the leg hang in a relaxed position until the sole or ground surface of the foot points vertically toward the ground. Don't pull or twist the leg out to the side; let it hang naturally.
2. Move your head over the foot until you can look directly down the ground surface of the foot in a vertical line. (***If you aren't looking perfectly straight down over the sole, or if the foot isn't hanging so that the sole is vertical, you will be looking at the foot at an angle. This causes parallax, an optical illusion that will mislead you.)***
3. Find the rue axis of the foot, an imaginary line down the centre of the foot that coincides with the direction of P-3. Locate the axis by imagining a line centred between the bulbs of the heel and centred on the hoof wall as it forms the sides of the foot. ***However***, since the creep factor may have distorted the shape of the existing wall, you must project the true direction of the wall by extending, in your imagination, the first half-inch or so of new growth closest to the coronary band. In order to have an undistorted view of the foot while you do this, you must align the axis of your own head, a line bisecting your face from forehead to chin, directly above the foot axis. Note that the natural hoof axis may be:

A. Angled slightly to the right of the centre of the pastern:
B. Angled slightly to the left: or
C. Perfectly straight in line with the pastern (rarely!).

REMEMBER, YOU ARE INTERESTED IN THE DIRECTION OF THE HOOF, NOT OF THE PASTERN.

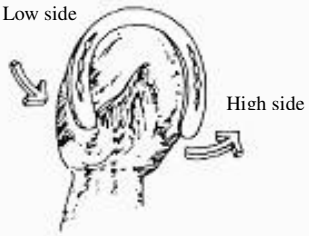
4. Imagine a line drawn across the bearing surface of the hoof, from one side to the other. ***Check that your head is still lined up with the axis of the hoof to avoid parallax or optical illusions.*** If the hoof is in balance, that line, which represents the ground surface of the hoof, will be perpendicular to the hoof axis.
5. If the hoof is out of balance, the ground surface will be 'tilted' off the perpendicular, making one side higher and one side lower. Comparison with a true perpendicular shows you how much and where the hoof needs to be trimmed to bring it back into balance.

INDICATORS OF HOOF IMBALANCE

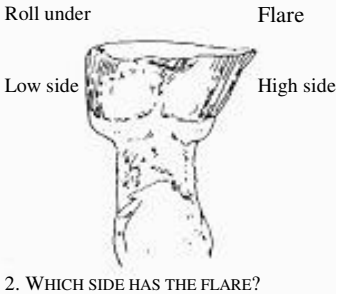


1. FIND THE HIGH SIDE
If one side of the hoof is higher than the other in relation to a line perpendicular to the hoof axis, the hoof is out of balance. ***Don't confuse the hoof axis with the pastern axis, they may be different.***

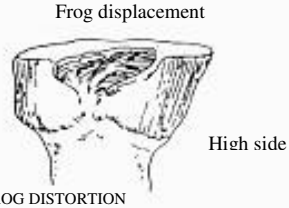
3. HOOF ROTATION
An imbalanced foot will tend to tilt or rotate toward the high side. This can make a straight leg appear crooked or a crooked leg appear straight.



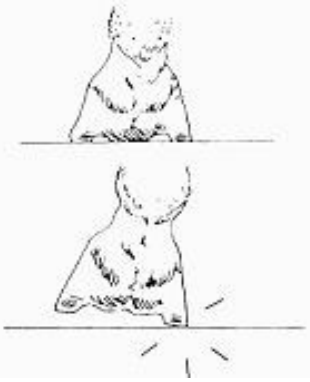
5. SHOE SHIFTING AND NAIL PULLING LOOSE
A shoe tends to shift toward the high side. The other branch of the shoe will tend to slide in toward the centre of the foot on the low side. The nails may loosen more and the hoof may show more tendency to break up around the nails on the flared or high side.



2. WHICH SIDE HAS THE FLARE?
The hoof will tend to flare out on the high side and roll under on the low side. This is due to the plasticity of the hoof, which is subject to a 'creep factor', a tendency to distort under pressure.



4. FROG DISTORTION
The frog may be compressed toward the high side. The groove or sulcis down the centre of it may give you an indication of the direction in which the frog has been pushed.



6. DOES THE FOOT LAND FLAT ON A FLAT SURFACE?
A naturally balanced hoof should land flat on a flat surface, obvious rocking or twisting of the hoof when landing indicates imbalance. Caution this is the most difficult indicator to observe, and there is a great chance of misleading parallax. It is much easier to see and evaluate from behind the foot than from the front. Some horses are 'floaters' allowing the bones of the foot to shift and change position slightly on the way to the ground making it almost impossible to tell whether the hoof lands flat.

If the ground surface of the hoof is perpendicular to the foot axis, the hoof is in balance -- but it this is very unusual in domestic horses. If the hoof is out of balance -- which is much more likely -- one side will extend past the imaginary perpendicular line. This is the 'high' or' long' side, the side of the hoof that hits the ground first and throws the foot out of balance. The amount of foot that extends past this perpendicular line is what has to be trimmed away in order to balance the foot. (***When it isn't possible to take off that much foot, it may be necessary to shoe the horse with a shim on the low side in order to get the ground surface perpendicular to the hoof axis.)***

Most people find it difficult at first to visualise the relationship of the ground surface to the axis of the foot, especially in a normal, less-than-perfect hoof. Don't let the existing ground surface lead you to a false impression of the axis; it is only result of hoof wear and balance (or imbalance). First find the axis -- the direction of P-3 as it naturally meets P-2: then use ***it*** to evaluate the correctness of the ground surface.

Once you have found the axis of the hoof and compared the direction of the ground surface, there are a number of secondary indicators, shown in the box on page 6, that can help you check your findings. None of these indicators is as reliable by itself as the first one, but they can help you confirm your first impression.

EVALUATING ANGLE

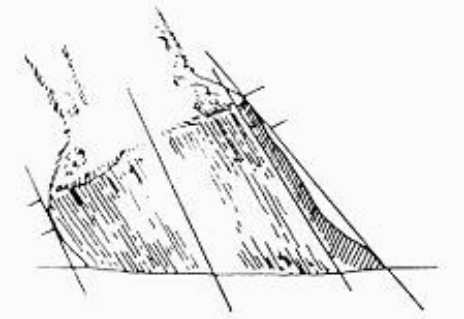
The angle of the hoof, as seen from the side, is important to hoof balance; but it's less critical than lateral balance because the leg has more flexibility from front to rear than from side to side. The bones and joints of the foot and leg are shaped so that they can take a much greater range of motion in this direction; they flex, extend, and sink under the weight of the horse at every stride. Hence the foot and leg structures can cope with a slight angle problem than they can with a lateral imbalance. Just as in balancing the foot laterally, the aim is to keep the bones in their natural alignment.

Much of the stress on the structures of the foot and leg occurs at the moment just before the foot breaks over, while it is pushing against the ground at the end of the stride. When the force of the hoof and leg meets the resistance of the ground, something has to give. This can happen in three ways:

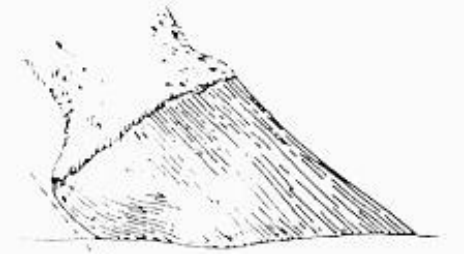
On soft ground, the edge of the hoof bites into the ground, making a deep footprint and perhaps tossing a divot into the air. In this case, the ground gives way to the hoof. A sharp-edged hoof cuts the deepest into soft ground -- as you know if you've ever tracked a loose horse's progress across your neighbour's lawn!

On hard ground that won't give way to the foot, the hoof wears down or breaks away, creating a rounded-toe surface that breaks over easily. Mustangs wear their toes down to a rounded shape naturally; your farrier might roll your horses toes deliberately in trimming or shoeing to make it easier for his feet to break over.

EVALUATING ANGLE



First half-inch or so is OK. Wall lower down may be wavy or distorted; this can mislead you about the angle of the hoof



If a hoof has been out of balance for a long time the horn tubules may start to curl under at the heel.

Shoeing a horse with long toes in a mistaken attempt to give him a longer, flatter

stride can predispose him to tendon, ligament, and foot problems. When a sharp-edged foot pushes against hard ground, the structures of the foot and leg are strained. A shod hoof can't wear down to a rounded toe as an unshod hoof can, especially if it has borium or a toe grab at the front. The longer the toe and the more unyielding the ground, the greater the stress, especially on the flexor tendons, suspensory ligament, and navicular bone. A long toe, on hard ground, even in an unshod foot, throws strain on all these structures.

To evaluate angle, study the foot from the side as it rests on the ground. The shape of the wall at the front of the foot may be distorted by stress of being out of balance. Or it may have been made wavy by an attack of laminitis. The heel may also have been distorted if the foot has been out of balance for a long time; constant pressure causes the horn tubules to change direction and curl under. The clue to the true angle of the hoof, and so to the angle of P-3 underneath, is the new growth within half an inch or so if the hairline at the top of the foot. Extending imaginary lines from not-yet-distorted segments of hoof wall, front and rear, will give you the true angle of the front and show you what portions need to be removed. If the heel has grown under, your horse may need the support of a degree pad or a corrective shoe while his hoof grows out. This condition takes a long time to develop, and it will take a long time to correct.

AFTER BALANCING

Once your farrier has trimmed away the excess wall and flare and restored the natural balance, your horse's feet will break-over more easily, travel a straighter path through the air, and be less inclined to interfere. When his feet land, the structures in the legs will be relieved of the twisting and concussive effects of improper alignment.

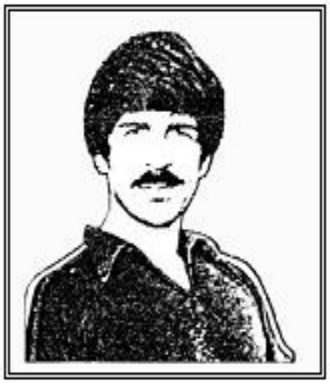
How much difference can this make to your horse? Quite a lot, even if you aren't yet aware of a problem. Horses whose feet were rebalanced according to these principles have improved dramatically both in attitude and in ability to perform. Lamenesses have disappeared and discarded athletes have returned to win in top-notch competition.

This method won't straighten your horses legs if he was born tom toe in or out. It won't make a crooked leg move through the air with the true, straight flight path of a perfectly conformed leg. But it will allow your horse to use his feet and legs as best he can, within the limitations of his conformation. And, as the mustangs prove, limitations of conformation are hardly limits at all when compared with the well-meant limitations imposed by human intervention.

"After years of trying to apply straight-line theories to crooked objects, horses legs, I decided to go straight to the source and find out how a 'natural' horse hoof really looked", says farrier Gene Freeze.

For the investigation he joined forces with Dr Michael Kirk, a former horse-shoer and now the federal veterinarian at the Palomina Valley Mustang Station in Sparks, Nevada, who has examined more than five thousand wild horses. "Virtually al of the horses I studied there, and all those seen by Dr Kirk, seemed immune from the agenda of horrors we regularly see in the feet and legs of the domestic horse". After observing how horse feet wear naturally, Gene developed a new approach to foot trimming based on the individual horse's conformation rather than on an ideal. This method, he believes, can lower " the incredibly high number of breakdowns in our domestic horses", in July he will bring out *'The Book You Need if Your Horse Has Legs: A Sound Approach to Shoeing'*, a detailed explanation of the theory and application of his new method. Also available in July will be a device to assist horse owners in the evaluation of their horse's feet.

Gene, who grew up in the horse country of Virginia, keeps some of the foremost feet in the performance world in top competitive condition. After settling for a time in Pennsylvania to pursue his interest in farriery, consulting Jack Anderson, the corrective-shoeing expert at the University of Pennsylvania's New Bolton Centre, Gene established himself in Gaithersburg, Maryland. Since then his clients have included the United States Equestrian Team's horses for the 1978 World dressage Championships and in 1979 Pan American Games.



Not all of Gene's time is spent under horses. He teaches classes in the basic anatomy and physiology of the lower leg and hoof in Anne Arundel College's continuing-education program, and he has contributed articles to such publications as Equus and Professional Horseman.