Finding the Rhythm of the Trail

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Riding on roads involves a moderate effort sustained over a long period of time. We set our computers and hope at the end of the ride to have a favorable mile per hour average, and we like to accumulate the miles. We judge the progress of our fitness by how many miles we are able to ride. And we hate the wind in our face because it retards these goals.

When road riders first encounter the trails they are usually frustrated because their speed drops by half or two-thirds as well as the miles they are able to comfortably ride. They feel like they are crawling through the woods and getting nowhere. And the legs which work so well on the road do not respond as they should. Some significant differences have been introduced into the ride.

Riding trails involves a relatively high level of effort for a short period of time followed by a period of little or no effort. It is as if we are doing very short intervals. The ability to put out bursts of energy and then quickly recover is a very different type of fitness from the long sustained effort. Studies have determined that those who ride trails develop a much stronger, much more efficient pedal stroke than those who confine riding to roads. The trail rider must put away the need for speed and miles in favor of an experience with nature.

The trails are ever changing: ground shifts, trees fall, rain collects. And each trail has a unique character inherited from those who built it; they twist, they turn, they flow as a gentle stream over the landscape. For those who take their time they present a special rhythm in concert with the forest. To discover this rhythm is to dance.

It is not necessary to ride every inch of a trail. Indeed, it is perfectly permissible and advisable to walk sections of the trail for which the rider is unprepared. The rider cannot force the bike down the trail. Learning the dance steps and thereby riding more of the trail is much of the appeal of trail riding. And as with the Viennese Ball, those who only know the simple box step can enjoy the spectacle as much as those with dazzling complexity at the outer ring of the dance floor.

The basic “box step” of trail riding is not difficult or demanding. The learning curve to reach toward the elegance and flair of the “outer ring” provides great rewards and can continue indefinitely.

Stability and the Line

The basic problem facing the trail rider is maintaining bike stability over twists, turns, obstacles, and otherwise uneven terrain: “keeping the rubber side down” as they say. Bikes are most stable and efficient when they travel in a straight line. And bikes know how to travel in a straight line without us. If you walk with your

bike pushing by the seat it will go straight very nicely without steering. Inasmuch as bike stability is the key to trail riding it would seem problematic that a trail is anything but straight.

The solution to this problem is to think of the trail as a series of straight lines. Each line is a clear path within the capability of the rider connected to the next line by a transition. (Here we can see enormous possibilities for continuing the dancing metaphor, but we will dispense with that for fear of getting too corny.) The speed with which we are able to ride a trail is governed more by our ability to rapidly process data and determine the ride line than by our strength and fitness. Step one, then, in learning to ride trails is learning to recognize and ride a straight line.

When we ride roads we generally ride a few inches inside of the white line which designates the shoulder of the road. This is the safest place to be and is least likely to have debris. Here we are riding a straight line mile after mile quite naturally and without thinking. Yet when riders go to the trail it is often quite difficult to ride a straight line. The reason for this is that on the road we are ever vigilant of danger ahead: a car might turn in front of us, an intersection might be coming, there may be road hazards, etc. On the road we are always looking where we are going. When riding trail, on the other hand, we tend to look where we are. Bikes can read your mind. They know where you are looking, and cannot resist going there. For this reason, if you look where you are instead of where you are going it is not possible to ride a straight line.

Once the rider has determined the ride line, attention should be on determining the next ride line, always looking ahead. A sudden change in attitude or loss of confidence while riding a line can only make the bike unstable. Once on a ride line the only alternative to riding is a complete stop. It is quite common for beginning riders to lack resolve. Objects innocuous from a distance can be threatening up close. It is therefore very important for beginning riders to ride lines for which they have complete confidence, walking the rest.

In addition to loss of confidence in the ride line, other distractions that are not on the ride line can catch the attention of the rider. In this case the bike will just as dutifully go where the rider is looking: likely into danger.

Today’s mountain bike is incredibly forgiving. If the rider sits back to take weight off the front wheel, the bike will roll over seemingly impossible terrain with ease. In addition, trails which are designated as “easy” or “beginner” generally have only features which can be easily rolled over. The essential difference between the beginning and intermediate rider is that the bike helps the beginner over trail features; the intermediate rider helps his bike over trail features.

Various drills can be devised to teach the rider how to ride a straight line. Two parallel ropes, two parallel lines of sticks, a board, etc. can define a ride line.

Starting on flat smooth ground the rider can progress to uneven ground, uphill, downhill and side hill, adding distractions, and making the line narrower. Roll over objects can also be added as confidence improves. With practice riding a line on trail will become as unconscious as riding the white line on the road.

Determining whether a ride line is within the capability of the rider is somewhat easier. If the rider is at all tense, if the rider has a “death grip” on the handle bars, then the line is not rideable. The bike will work for the rider only if the rider is totally relaxed. Relaxation comes when the rider decides to put away the need for speed and miles and enjoy the rhythm of the trail.

Transitions

Obviously the series of ride lines need to be connected. We previously learned that bikes know intuitively how to travel in a straight line as we pushed the bike by the seat without using the handle bars. If we push the bike in the same manner, and lean it slightly, then the bike will turn on its own. The angle of the front wheel will be adjusted by the bike to exactly counter its straight line momentum. Our problem as riders is to learn to duplicate that which the bike does so naturally. Usually riders have problems making transitions on the trail by over-steering and under-leaning. This results in the front wheel digging in and momentum carrying the bike out of control.

Bikes weigh in the neighborhood of twenty to twenty-five pounds, while adult riders may weigh between one hundred twenty-five and two hundred pounds. Even the light rider outweighs the bike by a factor of five. It is very difficult, therefore, for the bike to lead the rider. The rider must lead the bike. The rider shifts weight to initiate the transition, counteracting forces of terrain and momentum, and the bike follows.

This is quite different from making a corner on the road. On the road we place all our weight on the outside pedal and keep our weight in the middle. The wheels are loaded equally while weight to the outside pedal increases traction on both wheels. Trail riding is done at much slower speeds and over uneven ground. At slow speeds power will usually need to be applied to the pedals during transition. It is common to require more traction on the front wheel than on the back. The pedals many times need to be ridden parallel to the ground to keep them from hitting obstacles on the trail. Often the transition is so abrupt and sharp that the bike needs to come to nearly a complete stop in order to complete the turn. Since the rear wheel tends to short-cut corners, the effect of a turn is to narrow the trail. For these reasons, even on the easiest of single track the rider is constantly shifting weight forward, back, and side to side to match the demands of transition: to match the rhythm of the trail.

Here is a drill to learn transition. On flat smooth ground, place two objects such as water bottles a good distance from each other and ride a figure-eight around

them. Take your time. It is most important to practice slow speed. The rider will need to shift weight and continue pedaling to make tight turns. As the ability to easily shift weight is acquired the objects can be moved closer and closer together, and the turns made tighter and tighter. The objects can then be placed on uneven ground, which will change the dynamics of weight shift dramatically.

One of the best places to practice this drill is in a grassy park using trees as the objects to ride around. The grass provides a soft landing in case of misjudgment, while trees can provide an infinite variety of turning possibilities. Roots and sticks typically found at the base of trees add significantly to the drill. As more bike handling skill is acquired these figure-eights can be practiced on hills. The bike and rider will become one, dance partners if you like.

Starting and Stopping.

A very common transition is to stop the bike and adjust it to the ride line. The rider puts a foot down and scoots or lifts the bike, or gets completely off and walks over unsatisfactory ground. Inasmuch as trails are typically on side hills and have a three to five degree out-slope, it is very important for the rider to put down the foot on the inside of the trail to keep from falling down slope. Most riders have little trouble stopping and putting down either foot. Getting going again on a trail becomes problematic.

Children typically learn to ride by being pushed first to develop momentum. A bike in motion on a straight line is naturally stable. Children learn to mount the bike first by putting a foot on one pedal, scooting to gain momentum, and then swinging a leg over the seat. Or they learn to straddle the bike and put pressure on one pedal, initiating momentum of both the bike and rider. These methods are very effective on hard surface. They are not generally satisfactory on uneven ground.

If we scoot the bike and swing a leg over, a great deal of weight is moving in a direction other than down the ride line. Bikes get annoyed when too many things are happening at once. Inertia of the rider conflicts with inertia of the bike moving down the trail. The bike and rider are unstable for a considerable period of time until the rider is settled on the seat. It is very difficult to maintain the ride line during this time. In case the rider loses control a crash is inevitable as both bike and rider are already in motion. In addition, the bike may be on an up-hill where gaining initial momentum is difficult or impossible.

The straddle method is more satisfactory in that bike and rider are moving in the same direction. However, the tread surface of a trail does not provide nearly the traction of a hard surface roadway. Considerable torque is necessary to get both bike and rider in motion. This results in a tendency for the rear wheel to spin out, especially on an up-hill. The bike is out of control when the rear wheel spins out. If the bike and rider are both in motion when this happens a crash is likely. By

tipping the bike a rider can be on the seat when initiating the straddle mount. However, this adds motion of the rider across the ride line similar to swinging a leg over together with its attendant problems.

There are two ways to solve the bike mounting problem by modifying the straddle method, both require development of balance. First, with the bike vertical, the rider can step on a pedal that is in the down position and lift to the seat without bike or rider moving forward. There will be a short period of time where the rider needs to balance on the bike without moving. This is called a track stand. If the bike is on an up-hill, brakes can be applied to maintain position until the rider is ready to proceed forward. There being only one thing happening, one inertial force straight up, the rider can easily maintain control. In case the rider loses balance it is a simple matter to put a foot down and try again. A crash doesn't occur because the bike and rider are not moving.

In the second modification to the straddle method the bike moves but the rider does not. With the bike vertical, the rider steps on a pedal that is half way up and draws the bike underneath to gain the seat. Once on the seat the rider can proceed. This method requires considerably less track stand time. Another advantage of this method is that the rider moves less. Here again it is a simple matter to put a foot down and try again if the rider loses balance.

With either mounting methods the bike must be vertical. Otherwise, the weight of the rider will be moving across the ride line resulting in instability.

The best way to learn the track stand is on the road. While pedaling, come to a gradual stop and pause as long as possible without putting a foot down. At a traffic light, see if you can remain in the track stand position until the light changes. After gaining a comfort level try mounting to a track stand on the road, then move to uneven ground. Finally, practice the track stand while doing straight line or figure-eight drills.

The benefits of balance are enormous on the trail. Trail riding is so slow that the bike often comes to a stop whether on the ride line or in transition. With good balance the rider can continue without putting a foot down, or stop and start with ease.

Riding Over

In learning to recognize and ride a straight line a beginning rider usually considers avoiding all nefarious items on the trail. This is an impossible task. Trees are constantly dropping branches indiscriminately. Rocks grow from under the trail as if alive. And ever-changing shadows make these things more or less onerous. A rider must instantly recognize key threats to avoid and ride happily over the rest.

Mountain bikes are incredibly kind and forgiving as long as they are allowed to meet their challenges head-on. Momentum of the bike must be perpendicular to the object to be ridden. Mountain bikes routinely save riders from the most reckless indiscretions. But the mountain bike has to be allowed to do its job. In trail riding, as with all sports, relaxation is the key to success. The bike cannot do its job unless the rider is totally relaxed. A tense rider will make the bike hit much harder than a loose relaxed rider. A tense rider will likely shy from the ride line at the last instant, creating instability.

Beginning riders, at least the young ones, tend to be more than a little impatient. They see their friends or others negotiating difficulties and want to prove their mettle. Older riders tend to be embarrassed when unable to keep up, and therefore try to hold on with teeth tight. All this is all very counter productive in the learning process. All this will lead to an impression of trail riding as long periods of hard effort interspersed with short periods of sheer terror. These riders are not relaxed. Even if these riders traverse difficulties beyond their means the incident will be etched in memory as a retardant to learning.

A rider must never ride over anything without being relaxed. This means beginning riders must start slow and small. By adding small objects to the drills mentioned above, a beginning rider can go through this slow and small period in a controlled environment without competition or pressure.

You and the Handle Bars

Bikes know intuitively how to be stable. They get upset if riders force them. Occasionally, however, the bike needs help. For this reason, riders should always wrap their thumbs around the bars in order to be prepared to help.

The front wheel of the bike contacts the ground for only about an inch. In contrast, the handle bars are some twenty or more inches in length. As a result the rider can generate tremendous leverage against adverse movement of the front wheel. One arm can push while the other pulls which generates even greater leverage. In addition, a small movement of the front wheel is translated into a relatively large movement of the handle bars. This allows the rider to feel the movement of the front wheel long before passing a critical point and react accordingly. Reaction rather than anticipation is the key to bike handling.

Reaction rather than anticipation allows the rider to be totally relaxed. Handle bars should be gripped very loosely. If the rider sees some obstacle on the trail and puts the bars into a death grip out of fear, the arm muscles on the two sides cancel each other out like a balance scale. No matter how much weight is placed on a balance scale, if the same amount is placed on both sides the scale moves quite easily. This is also the “trick” of arm wrestling. An opponent who can be enticed to tighten both the biceps and triceps at the same time in anticipation will have these muscles cancel each other resulting in weakness.

Another reason to grip the handle bars very loosely is to keep jarring of the bike from being translated to the body of the rider. This jarring can be severe enough to launch the rider from the bike. It is a grave mistake to ride over any obstacle for which the rider feels a need to anticipate. Often the bike will react to such an obstacle quite differently than judged. Even if the rider survives without mishap the jolt will be implanted in the mind for a long time. The rider will have a very difficult time learning to ride this obstacle relaxed: a flattening of the learning curve. *Riding only that which can be ridden relaxed is perhaps the most important rule for successful trail riding.*

Learning to Sit Back

Sitting back is one of the best methods to learn to relax on the bike. It is also the most effective defensive position. Sitting back takes weight off the front wheel allowing it to more easily rise up and over an obstacle. With less weight on the front wheel there is considerably less jarring. The bike seems to be able to somehow find its own clear path through the most intimidating rock garden.

Sitting back also allows the rider to keep control of the bike on a steep down hill and/or while braking. A rider's center of mass, when on the seat, is above the bike's wheels. As the rider applies pressure to the brakes, the force to slow the bike is located where the tires meet the riding surface. An equal and opposite force occurs at the rider's center of mass. This opposite force tries to rotate the bike along the line of travel. If braking is severe enough the rider will go over the handle bars: going end-for-end as they say. Sitting back counteracts this force. Sitting back puts more weight on the rear wheel which allows more even braking with both wheels.

In severe cases, the rider can get all the way behind the seat. The seat can be locked between the rider's thighs as a further check against rotation forward of the rider. These positions may seem to be overkill to a rider only interested in casual trail riding. However, unforeseen emergencies occur whether on the trail or on the road. Comfort with this defense can add immeasurable safety and security to any kind of riding. Using this technique will give the rider the confidence to relax.

When a Seat is not a Seat

Being relaxed on the bike does not mean that the rider is blasé, passive, or otherwise in a state of repose on the seat. In fact, the rider is forever in motion on the seat, reacting to the bike and the terrain. The seat is used as a reference point when the rider sits back so the rider knows where the center of mass is located. The seat is also used to stabilize rider with bike. As a stabilizer, the seat allows the rider to apply even pressure on the pedals through a full three hundred sixty degrees which makes spin out of the rear wheel far less likely. And the seat

is used as a leverage point when locked between the rider's legs to keep the body from moving forward out of control.

When we dance we sense our partner hand to hand, hand to back, hand to shoulder, hip to hip, etc. An increase or decrease in pressure tells us what our partner is doing or what our partner is about to do. This connection allows us to respond to the movements of our partner without thinking as we flow effortlessly around the dance floor. To anticipate rather than respond is to court disaster of misstep or worse.

The rider responds to the bike much the same as a dancer responds to a dance partner. For example, when a bump is felt through the connection with the seat or handle bars, a rider can instantaneously respond by loading the pedals. With weight shifted to the pedals the rider's legs act as shock absorbers keeping rider and bike in rhythm with the trail. Learning the feel of this connectivity provides much of the enjoyment and beauty of trail riding.

Pedal Power and More

The pedals are the third connection between rider and bike, and provide power to the drive train. Road riders learn that a high rate of cadence provides the most efficient and sustainable power output. A rate of ninety or one hundred pedal strokes per minute is common on the road. On trails this high rate of cadence can become counter productive.

Trail riders must contend with uneven and sharply undulating terrain which requires constant weight shift. A high rate of cadence interferes with the ability to shift weight and to time that weight shift with terrain. In addition, a high rate of cadence at the slow speed of trail riding easily degrades the rider's balance. This is particularly evident in beginning riders approaching a steep pitch. The steep pitch intimidates the rider, inducing a shift to granny gears. These low gear ratios promote an assent beyond the bike handling capability of the rider and beyond the sustainable work output of the rider. At one-half or two-thirds of the assent these riders typically fail as balance degrades with fatigue.

On downhill runs road riders attempt to produce the same power output as on uphill or flat stretches. Trail riders, on the other hand, typically ride downhill off the seat with pedals parallel to the ground in order to take advantage of the shock absorption ability of the legs and to be in a position to react instantly to the trail. Trail grades change quickly. A higher gear ratio allows the rider to better carry momentum up and over the next pitch.

Pedals often have to be in the up position or parallel to the ground in order to clear objects on the trail. Under these circumstances power must be applied rather intermittently and yet forcibly. Timing of the power stroke and amount of power applied is much easier at a lower rate of cadence. Timing, cadence, and

power of the pedal stroke come together as part of discovering the rhythm of the trail. We dance to the music not from the music.

Putting It All Together

If we consider a horse and rider in a race, the horse goes through a lot of motion as it gallops around the track. The horse moves up and down, springing forward with every stride. The rider, on the other hand, does not move up and down to any appreciable extent. The rider's center of mass determines a straight line parallel to the ground. Also, the rider's center of mass moves at a constant velocity, neither accelerating nor decelerating with the movement of the horse. If we isolate the view of horse and rider from the ground the horse appears to be moving back and forth under the rider. The rider uses his contact points with the horse to even things out. This makes life easier for the horse in that he has a constant load to work with. This makes life easier for the rider in that the rider does not take a pounding. The rider has found the rhythm of the horse.

As we learn to find the rhythm of the trail we are learning to keep our center of mass along a straight line parallel to the ground, to let the bike work freely under us. As the bike momentarily accelerates or decelerates in order to save us from those demons of the trail, we shift our weight in order to maintain constant velocity. We shift our weight in order to make things easier on the bike and easier on ourselves. The bike bounces along happily down the trail over bumps, dips, rocks, and logs. Suspension on today's mountain bike also helps to smooth the trail and relax the rider. There is, however, a limit to this felicitous union. When an object in the trail exceeds four inches it becomes unreasonable to expect the bike to do all the work.

Weight ratios of rider to horse are very small, whereas weight ratios of rider to bike are large. With proper technique it is quite easy for a rider to lead the bike rather than react to the bike. A rider can, for example, lift a wheel off the ground while riding, or even jump the bike off the ground completely. Likewise, an acceleration or deceleration of the rider's mass can have an overpowering impact on the bike and its interaction with the trail. This is the essential difference between beginning and intermediate riding: the bike helps the beginner, while the intermediate helps the bike.

Lifting the Front Wheel

The easiest way to help the bike over an obstacle is to lift the front wheel. This also keeps the rider from being thrown forward as the bike hits the object. When this technique is learned, riders routinely apply it to even the small and unobtrusive. Here are three methods for lifting the front wheel while on the seat and one while standing.

A rider can decelerate or throw weight back while riding, jerking sharply on the handle bars. This is the beginning method. It gets the front wheel off the ground quickly. It is often employed as an emergency reaction when a trail feature has been seen late or has been misjudged. This method can be rather hard on the arms as the jerking motion is translated through the arms. On a constant basis this method can lead to elbow and shoulder problems for the rider. This method is also not very controllable. It is easy for the rider to jerk the bike off line or to pull the bike right or left to an unstable position.

A second method to lift the front wheel is to first load the front suspension, depressing it. As the front suspension rebounds from its depressed position the rider can throw weight back and pull on the handle bars. The assist from the front suspension decreases the jerk through the arms. As a result, the front wheel is lifted much smoother and with more control. The time it takes to depress the front suspension is a disadvantage of this method. In an emergency there is usually not enough time for this method.

In either of the first two methods the front wheel is off the ground for only the time it takes for gravity to return it to the trail. This makes timing the lift critical. Since the second method requires two movements of weight, timing this method is much more difficult.

In the third method, the rider sits back on the seat and applies a very strong pedal stroke while pulling back on the handle bars. The rider develops enough torque to rotate the bike about the rear wheel. Beginning riders often experience this while riding up a steep hill. By not keeping weight forward, the torque necessary to gain a steep pitch can easily put the rider over backwards. The advantages of this method are many. Since the front wheel is not jerked, the rider has much more control. The method is as instantaneous as the first because the rider is always in position to pedal. The rider can keep the front wheel off the ground as long as strong pedaling continues which makes timing the lift less critical.

While standing with the pedals parallel to the ground the rider can jump up and slightly back to unload from the bike. As the rider unloads the bike, the front wheel can easily be drawn up with the rider. This is actually the first part of a “bunny hop” which will be discussed in more detail later. This method works well with good momentum. If the rider is already standing on the pedals for other reasons offered by the trail, or if the rider is sitting back in the defense position, this method is quite easy and natural. If the rider must pedal to provide momentum this method is of marginal use.

Often the trail feature which requires a front wheel lift also involves a subsequent shift of weight. Since the third method does not require throwing weight the rider is better able to set up and execute the second move smoothly and easily.

Likewise, the rider is in an excellent position for weight shift using the fourth method.

Lifting the Rear Wheel

If it is necessary or desirable to lift the front wheel it is usually appropriate to lift or at least unload the rear wheel as that second move. Shifting weight forward and loading the handle bars with the rider's weight will allow the rear wheel to roll easily over most things. An expert rider can lift the rear wheel completely off the ground with only a forward weight shift. Most riders need clip-less pedals to pick the rear wheel up off the ground.

In addition to getting the bike over trail obstacles, wheel lifting is often required to ascend steps or ledges. It is difficult to gain an uphill step by pedal power alone because the rear wheel tends to spin out. In this case the rider lifts the front wheel up the step and immediately throws weight forward to gain the step before the bike. The rear wheel will follow easily. This is a good example of how the rider can impart momentum to the bike without pedaling.

Switchbacks on narrow trails are often too sharp to roll around. In this case an expert rider will use a rear wheel lift to negotiate the turn. The front break is applied to lock the front wheel. At the same time the front wheel is turned into the turn. With the rider's entire weight shifted to the front wheel, the rear wheel is lifted and allowed to swing around the front wheel by the momentum of the bike.

Bunny Hops

When speed makes lifting the rear wheel is impractical, or the chain ring will not clear an obstacle a jump is in order. Beginning riders often spring from the pedals taking the bike with them to get off the ground. This method can be effective; however, the bike can easily stray from the ride line. In addition, the rider has little control over which wheel will impact first while airborne. If the front wheel impacts first it will have the tendency to dig in which can lead to the rider going over the handle bars. In either case the bike is prone to instability.

The bunny hop is a much more stable method to make a jump. Bunnies hop by first lifting their front legs and springing off their back legs. A rider unloads from the pedals and at the same time lifts the front wheel as with a normal front wheel lift. With the front wheel off the ground the rider lifts the rear wheel. This two step process allows the rider to easily adjust the amount of rear wheel lift so that the rear wheel will land first.

In addition to clearing objects on the trail, the bunny hop is also an effective method to negotiate drops. The more severe the drop, the more the front wheel

tends to be overloaded upon impact. By using a bunny hop the impact can be spread over both wheels.