

Coach **C**arl

A Better Way To Train



**"WOW! 662 PAGES OF PURE CYCLING
ENJOYMENT...THIS IS A GREAT BOOK!"**

--- George Ranalli

Carl Cantrell

A Better Way To Train Electronic-Book (PDF) Version

By: Coach Carl Cantrell

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Supercedes all Previous Versions

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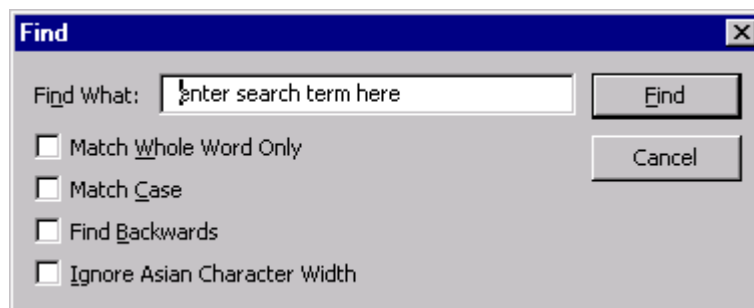
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Coach Carl Cantrell



Carl Cantrell's love of cycling began with his first bike, a used 24" Texas Ranger balloon tire bicycle he received as a Christmas present from his teacher, Mrs. Wendt, while attending fifth grade at Sacramento Elementary School in Alamogordo.

In 1968, Carl bought a new Schwinn Varsity ten-speed that he used for commuting around campus at the University of New Mexico, and riding around Albuquerque after classes and on weekends. It was his first road bike. Back then, recreational cycling was yet to enter its boom years of the 70's, Carl wasn't even aware that bicycle racing existed and he had never heard of the Tour de France. So by May of that year, he went looking for a club to ride with so he could learn more about cycling.

Turns out at that time the only cycling club in the State of New Mexico was a racing club called the Duke City Cyclists. Carl joined the club and began riding his Schwinn Varsity on their training rides. To their surprise he could stay with them on those hard training rides and it wasn't long before they had talked him into racing bikes. Carl bought his first pro road bike, a Peugeot PX10 and at only 19 years old, this began his bicycle-racing career. He was hooked for life.

By 1969 he had become the New Mexico State Road Champion, a title he retained through 1970. At the time he was still in college majoring in engineering, but now convinced that he wanted to make a career of cycling, changed his major to coaching. His goal at the time was to race for a while, coach for a while, and then build a racing school for kids. It was purely

coincidence that the University of New Mexico had one of the best coaching programs in the nation. While working his way through college he found the time to continue racing, promote a number of races, and form two racing teams including one college program.

If you ask Carl, he'll tell you that the most important influence during this period of time was the people he had an opportunity to train with individually and learn from. Carl would like to thank these people and appreciates the many others who taught him over the years.

Perhaps you know some of the names:

Mike Dennis

Mike was one of the two people instrumental in getting Carl started in racing. Mike had been racing since the early 1960's and had traveled throughout the Midwest and Western US racing road and some track. He consistently finished in the top three to five in the biggest road races, finished second in the Aspen Alpine Cup (precursor to the Red Zinger which later became the Coors Classic) when it was the biggest stage race in the US, and he rode Mt. Evans six times never finishing worse than sixth. He won Mt. Evans in 1968. Mike was a regular training partner with Carl in 1968 and early 1969 and had a lot of influence on Carl's racing.

George Gamble

George was the other person who got Carl hooked on road racing. George who was from England, won the British National Junior Hill Climb Championships in 1959, was on the British Olympic Road and Track Team (Road Race and Match Sprints), was the British National Senior Men's Time Trial Champion in 1960, and rode in Europe as a neo-pro in 1961. George was also a regular tutor for Carl and taught him a lot about racing, training, and strategy.

Gene Rypka, PhD

Doctor Rypka was an exercise physiologist who taught Carl a lot about the function of the human body during the time Carl was studying exercise physiology and coaching. He taught Carl to use science in relation to exercise and rest to improve his cycling and Carl continues to use these valuable lessons with the cyclists he coaches as well as in his book; A Better Way To Train.

Tom Garrity

Tom Garrity was from the Chicago area and probably the best US road racer in 1967 and 1968. He was very experienced, fast, and smart. Outstanding at road racing and very good on the track, he helped Carl improve his sprinting, climbing, tactics, riding in bad weather, sports psychology, and racing in general. He was Carl's tutor during the spring of 1969 and was individually responsible for making Carl the best racer in New Mexico until Carl retired from racing. One of the reasons that Carl started training with Tom was that no one else in New Mexico would train with Tom because they couldn't stay with him. Carl figured that, if he could train with Tom and get to where he could stay with Tom; then no one would be able to stay with him either. It worked.

John Van de Velde

John was also from Chicago and with his considerable experience in Europe was ranked as one of the top eight pursuit riders in the world. Carl began training with John in the Spring of 1970 when Carl found out that like Tom, no one in New Mexico would train with John because they couldn't stay with him either. John was attending the University of Albuquerque and during the school year, he would fly to Europe every three to four weeks to ride Belgian pro-am road races with some of the best pro's in the world including the infamous Molteni Team, spending the entire summer racing in Europe. John taught Carl even

more about racing, training, European team tactics, sprinting, and just going fast. John later raced professionally for a number of years.

Carl's serious racing came to a halt following his marriage and the unforeseen medical problems his wife had within weeks of the wedding in late 1970, but he never lost his deep love for the sport of cycling. Even with these overwhelming personal responsibilities he was able to race on a sporadic basis while running training races and helping other racers get started.

Coaching Experience

Carl began his coaching career in 1984 with the Marina Del Rey Cycling Club in Venice, California where he managed and coached the road-racing program for Men, Women, and Masters. In 1985, he began managing his own beginning cycling program for bicycle track racing at the Encino Velodrome.

During that time, he also managed the developmental program and was the staging director for all major events at the Los Angeles 7-Eleven Olympic Velodrome.

Starting in 1986 through all of 1990, Carl founded, co-owned and coached the Los Angeles Racing Team (McNall Sports) to one of the best bicycle road racing programs in the US. Nationally, he had a combined top 10 Men's program team, top 5 Women's team, top 5 Junior team, and top 5 farm road program. In the last year he coached the team, he had over 350 wins and in-the-money placings with at least 80% in the top six. His Women and Junior teams were taking home at least half of the wins and top six placings every week.

Remarkably, he was able to simultaneously coach everyone from beginners to pro's, Juniors to Masters, and Men and Women. At the same time, he also coached individuals in track and mountain bike racing. Carl specialized in

recruiting and training beginners up to the national and international amateur and professional level. It's easy to see that it is that experience that now makes it easy for Carl to train cyclists from any level, up to any level and Carl continues to be known as one of the very best developmental coaches around.

In 1987, Carl worked for the international governing body for amateur bicycle racing as a consultant for the design, organization, and management of the Belizean Federation and Olympic Development Program for cycling. He also conducted a training program for the Belizean coaches and top athletes in Belize City, Belize.

While still working with his Los Angeles Racing Team, Carl was hired to consult with the United States Cycling Federation head national coach and staff on the design, organization, and management of the new Olympic Development Program following the 1988 Olympic Games in Colorado Springs, Colorado.

Education

Carl studied sports sciences, sports management, and coaching at the University of New Mexico when the program was ranked as one of the top five sports sciences programs in the nation and obtained a bachelor's degree.

His studies included exercise physiology, kinesiology, psychology, sports organization, sports management, athletic training, and youth coaching. Carl was trained in the fundamentals of coaching, officiating, organizing, managing, and promoting 15 to 20 different sports. In addition to this, Carl took an Elite Coach's course from the United States Cycling Federation on coaching both road and track racing.

From 1972 through 1976, Carl served in the United States Air Force in electronics warfare and counter measures. Carl also completed and holds a

degree in Master of Business Administration from the Anderson School of Management at the University of New Mexico. While working on his MBA in the mid 1990's, he worked with the Lobo Cycling Team at the Anderson School of Management at the University of New Mexico and helped the riders win a number of collegiate and USCF national titles.

Today, Carl lives in Alamogordo, New Mexico where he continues his coaching work through his personal coaching programs and eBook, A Better Way To Train. He is currently training athletes and helping coaches from all over the world through his web site and eMail.

When you think about it, Carl Cantrell has been involved with bike racing and coaching in one way or another since 1968, when he did that first serious training ride with the Duke City Cyclists. Over this 35-year span, Coach Cantrell has helped hundreds of cyclists from all levels and from every background.

Carl still finds the time to coach cyclists personally using his unique training methods however, due to his heavy workload can only take on a limited number of clients at one time. To learn more about his personal coaching programs and how he can help you with your cycling or racing, contact Coach Carl Cantrell at coachcarl@coachcarl.com or by using the on-line form available on his web site at <http://www.coachcarl.com>.



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Introduction

Love of Sport

I want to pass on something very important that I have learned from decades of racing, coaching, and studying the best athletes in the world in many different sports and that is:

“The most important key to success in anything is to love that thing and love doing it.”

When an athlete has been at the top and starts his decline, watch and you will see that the sport is no longer fun. If your sport has stopped being fun and it's not a pure joy to train or compete, the answer is simple; either relearn the love of doing it or go find another sport.

Maximum Enjoyment

I learned a long time ago that maximizing the enjoyment and achieving goals for cycling, whether competitive or recreational, requires more than just blundering down the road.

Getting the most from your cycling requires learning, mental development, tactical preparation, the proper equipment and set up, event bike prep, coaching, program management, and professionally designed training programs.

When I was coaching, I coached everyone as if they were going to eventually turn pro, and still do. It doesn't make sense to coach you to be

an amateur. You're already an amateur. I want to make riders better and the best are pros. It works.

Winning Is Radical

Unfortunately, over the years I've found that far too many athletes are so lacking in self-confidence that they are afraid of being different and have to train with the pack, the way the pack trains, for fear of being ridiculed by others for being different.

I have even noticed in many athletes a fear of succeeding because it would make them different.

But at the top of the sport, the pros have learned to seek out the coaches that are different, even radical in their approach to training. They know that if you want to win, you must train and race differently. They know that if you train and race like everyone else, the best you can do is finish like everyone else.

To win you must be different because winning is radical.

You see, if you have a race with 100 riders, one rider will win and the rest will lose. Winning is radical and if you want to win, you must train and race differently than everyone else. If you train and race like everyone else, the best you can do is finish like everyone else. You will lose.

As you read through my book and compare it to what other coaches do, you will find that my system is different from the way other coaches do things. I don't follow the crowd. I develop my own training programs and techniques to make my riders better than their competition.

By purchasing my book and the accompanying training tools, you now have the opportunity to take advantage of over 35 years of professional sports

training, experience, and success. I have used this training and experience to custom design training programs for every level of rider with consistent, winning results.

If riding has stopped being fun perhaps because you've stopped improving or feel burnt out, please pay special attention to my programs and methods in this book. At the very least, give them a try.

Remember, a radical program with radical results is a good program and not something to be afraid of.

I Want It

I have learned that the three most important words in doing anything are:

"I want it."

If you don't want it, you won't even try to get it. The next two most important words are:

"How much?"

Almost everyone wants an Olympic gold medal but only a handful want one bad enough to make the sacrifices required to get it. The highway to success is strewn with sacrifices and you can tell a champion by his or her sacrifices.

Tools

Always remember that your strengths are tools that you use against your competition and your weaknesses are tools you give your competition to use against you.

In this book, I offer you the tools of knowledge, experience, and success that you can use to improve your cycling. Will you use them against your competition or will your competition use them against you?

"The best you can be is the best that you believe you can be."

It works.



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Cycling History For Fun

Cycling History For Fun

I thought it would be fun and informative to share a little of my knowledge about the growth and development of bicycle racing in the two largest and best cycling circuits in the world. I thought you would find it interesting to learn about what it was really like to race and train 150 years ago and how we got to where we are not. You will find that this will answer some of the questions you probably have about why things are the way they are now.

I have broken this essay down into two topics, which are the growth and development of European Cycling and US Cycling. The reason for separating the two essays is because European and US cycling took two different paths for very interesting reasons. I find it interesting that both paths are leading to the same destination, just with two different journeys. Remember that this is just a general overview to give you a better understanding of sports growth and development.

When I first began racing bikes, I was fascinated with the nature of racing and have had an unusual opportunity to read books about cycling which are no longer in print and talk to people who raced and watched racing in the 1920's and 1930's including old, pro six day racers. Studying these things in conjunction with my studies in general history and the history of the development of sports has taught me some interesting things. I have also known and picked the brains of some old athletes from other sports, which provided additional insights to life in those times.

In my studies of the people who founded our modern sports from 100 to over 150 years ago, I fell in love with a group of heroes and pioneers for

which there are few equals today. They were truly great and daring people who make some of today's whining professionals look like sissies.

If Hollywood were to ever learn about the history of bicycle racing, they could make some really great movies without over sensationalizing one thing. I hope you enjoy the essays.

European Cycling

European cycling began in a very natural and interesting way. First, this new form of transportation intrigued people, which at that time, was the fastest form of land based individual transportation in the world. The automobile and plane had not been invented. There were only horses, wagons, trains, and walking. The roads consisted of cobbles (the best), gravel, dirt, wagon tracks, and single tracks (the worst.) Very few people traveled more than a few miles from their homes in their entire lives. There was no need for maps because people either traveled by train or just stopped and asked directions when lost.

The bicycle was the latest and greatest innovation of the time and was the latest in technology. Many of the best scientists and engineers made their living and gained fame developing a better bicycle. Many people today are amazed that two custom bicycle builders or "bicycle mechanics" invented the airplane.

What they don't realize is that, being a custom bicycle builder, meant you were an engineer of the time and were very knowledgeable in the latest technologies. As a matter of fact, the "wing warping" the Wright brothers used to give them the required control to make it possible for them to be the first to fly was based on the wheel building science I teach in my chapter on Wheel Building. They used wires and tension to control the shape of the wing and give them the flight control they needed.

Wheel building is also using wires (spokes) and tension to control the shape of the wheel. It was their knowledge of the bicycle and the latest technologies which permitted them to beat the best college trained scientists and engineers in the world.

As people developed better bicycles, it was only natural that they wanted to prove their bikes, as both builders and owners, against the bikes of others. This started with street races and evolved into road races. Clubs and activities quickly followed.

The basic scenario for a road race from idea to event was as follows. One or more groups or cycling clubs would decide they wanted to stage a cycling (the biggest thing of the time) event from one town to another. They would coordinate the start and finish details and send an announcement over the telegraph. Remember that there were no radios, televisions, or national magazines or newspapers. Telegraph, word of mouth, or local newspapers transmitted all news. Every telegraph would pick up the news at the same time and either post it outside their office for the village to read or provide the information to the local newspaper or town crier. Often, additional information was requested and obtained over the telegraph.

Cyclists had two ways to travel to the event. If possible, they would travel to the race by train; they would ride their bicycles to the race, or some combination of the two. Some cyclists rode their bikes two or more weeks to reach one race. They had to carry money to pay for lodging and food or worked to purchase such as they traveled. They rode a variety of contraptions called bicycles and even tricycles. They wore street clothes which consisted of button up dress shoes, slacks or knickers, a nice dress shirt and sports coat or jacket, wine flask, some form of back pack, and some form of hat. There were no racing shoes with cleats or event to clips and straps, jerseys, shorts, helmets, or any of the other cycling clothes and equipment we take for granted.

When the cyclists arrived in town, there was always a lot of people and excitement because this was often the most exciting thing to ever hit that town. People had come from all over Europe and even other countries. There was normally some form of registration for days prior to the event. Arriving athletes were instant heroes.

The morning of the race, the riders were gathered in the street at the designated start with a huge crowd of excited onlookers and given the basic instructions to reach the race. You have to remember that there were no copy machines so they couldn't make enough maps for the riders unless there was a local printing press willing to do so for the race. Even then, the maps were almost always inaccurate because more than half the riders would get lost and never make it to the finish. Simple attrition and tenacity often determined the winner.

After answering questions, the riders were sent off with a shot and a shout. They were completely on their own with no technical support or even the presence of officials. Some times officials would leave the start and travel to the finish by train or one group would start the race, telegraph the list of starters to the next town, and another group of officials would finish the race.

Except for locals or previous event participants, the riders would charge blindly into the countryside hoping the instructions they had gleaned from the locals would get them to the finish or that a printed map was actually accurate would get them there.

Some of these races would last for up to three days where the riders rode as long as they desired knowing that stopping was permitting your competition to gain ground on you. They learned to carry small oil lanterns hanging from the fronts of their bikes so they could travel at night. When they had run out of oil or just couldn't see well enough to ride a particularly rough road at night, they would dismount and walk their machines down unknown roads.

They would stop along the race to purchase food and drinks from markets or farms while asking directions from the locals. If the weather got particularly bad, they would hold up in a barn, farmhouse, local hotel, or under a tree.

Obviously, there were injuries and even deaths. I have often wondered if there might still be some rusting ancient machine and bones lying just off the road in the brush at the bottom of some hill on a remote road or trail from a cycling event, which took place 150 years ago.

These people were the true champions, heroes and pioneers of our sport and deserve our respect. They make us look rather wimpy, on our super bikes, with nice racing equipment, on very good paved roads, with technical support and traffic control, don't they? We just like to think we are tough; they really were tough. Now, maybe you can understand why it turns my stomach when I see professional bike racers whine because the Tour de France is too long and tough. Maybe it is that the Tour isn't too tough but that the riders aren't tough enough. Send the whiners home to Mommy and run the race. I grew up on really bad streets and learned quickly that, if you are not tough enough to take a whipping, don't go to the fight.

Obviously, the changing roads and bicycles along with the invention of the automobile have change the sport to what it is today. The sport of European road racing started as an individual sport but evolved into a team sport, which explains why we have a team sport, which places the greatest emphasis on an individual winner.

American Cycling

American cycling started out the same as European cycling but the companies making and selling bikes created another invention, which would change the direction of cycling in the US. They invented small, banked riding tracks to show off their bikes indoors and at other events like fairs.

Originally, these tracks were just demonstration tracks, which were only large enough for one or two riders to ride the owner's machine on so people could watch. But other people started making money giving lessons on how to ride a bike and started using slightly larger tracks to keep their students close while instructing them and so the teachers didn't have to ride with them.

Just as in Europe, the bike builders and owners started testing their machines and legs with informal competitions, which began to form into road races, "flat track races" (criteriums on roads or grass), and training races on streets. Some enterprising entrepreneurs with a lot of money realized the financial opportunities in building tracks to race on, charge admission, and permit gambling. Others quickly caught on to the idea and tracks popped up all over the US with more than 100 tracks existing in the US prior to World War II.

Realizing the competition that road races presented and that people wouldn't want to pay to see riders race on tracks whom they could see at road races for free, the track owners took advantage of a problem which had arisen with young men racing informally on the streets. These impromptu races were causing sprint finishes on busy streets with pedestrians getting hurt. Using this as their cause, the track owners used their money and political influence to get laws passed making it illegal to race on public streets and roads. This eliminated the competition and permitted track racing to dominate the US cycling scene.

These track races evolve from short scratch and sprint races to the first non-stop six-day race in the late 1800's. The first six day races were individual events where the riders raced as long as they wanted and the winner being determined by the rider who completed the most laps in six days plus there were jam sessions every evening before the crowds for seven nights in which the riders would spend from four to six hours sprinting for cash prizes.

The races would start in the first jam session and end in the last jam session so that the races were actually six days and four to six hours in duration.

The problem was that, if you stopped to rest and the other riders kept riding, they put laps on you and you lost. Therefore, they quickly started riding the entire six days without stopping except to eat or use the rest room. Riders then started taking drugs to keep awake and some began dying on their bikes. At this point, the government stepped in and said that something had to change or they outlaw six day racing.

To keep the non-stop six day format, the promoters changed it from an individual sport to two rider teams where no rider could ride more than 18 hours in any 24 hour period of time so that one rider would rest while his teammate continued on the track. This solved their problems and kept six day racing alive until World War II.

The promoters kept the seven evening jam sessions and added noon "matinee" jam sessions where admission was only a quarter of a US dollar and children often attended. In these jam sessions, the promoters would put up a certain amount of money for sprint primes and then they would pass the hat through the crowds to gather donations for additional sprints. Could you imagine four to six hours of intense interval training for seven consecutive nights while only getting six hours of sleep per day? That was old-fashioned six day racing.

The sport was so successful that, at the time Babe Ruth (one of my childhood heroes) was the best paid player in baseball making a whopping \$17,000 per year, a good (not the best) six day racer could make over \$1,000 in just one jam session. They were the best-paid athletes in the world and European racers used to come to the US to make money with few US riders traveling to race in Europe.

The really big money was in US and the US was the cycling center of the world with the biggest and best bike companies being US companies like Schwinn. The current Madison Square Garden is the third facility built under this name. The first two buildings were built specifically for bicycle six day racing.

World War II

World War II changed all of this. It interrupted both European and US bicycle racing. Following the war, European road racing picked up where it left off because the promotion of the sport was based on winning a particularly difficult event. Therefore, the event was the most significant promotional tool for the sport.

In the United States, US congressmen, especially senators, had been buying baseball teams for some time as “the thing for senators to do” and they saw an opportunity with the war to increase their revenue potentials. Under the guise of national defense, they stated that the country needed all these great professional athletes to defend their country but that they also realized the American people needed some sports entertainment during the war so they passed a law banning all professional sports except baseball. Of course, four years of this turned baseball into the national pass time and sport.

The effect that this had on US cycling was devastating. Unlike European road racing, the event wasn’t the most important promotional tool but the athlete because all six-day races were alike. All of the famous six-day racers were either dead or out of shape and turned to other easier sports like car racing. Andy Granitelli is probably the most famous of these.

Promoters tried to revive old six day racing, but, without the famous names, people just wouldn’t show up to watch a bunch of no bodies. The sport died but began gradually coming back as road racing. In the early 1970’s, there

was an explosion in US cycling (the second one), which caused a boom in bicycle racing. Interestingly, without the interference of the big track promoters, US racing has naturally developed the way it did in Europe with an emphasis on road racing.

Now the US riders travel to Europe to make the big money and the biggest and best bike companies became European companies. But the US is now fighting its way back into the top with companies like Trek and Specialized giving the European companies a run for the dollar and Lance Armstrong winning the Tour de France.



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Part I • Chapter One

Sports Psychology

Sports Psychology

In the four decades that I have been involved in sports, I have talked to a lot of good coaches and they have all agreed with me that sports are at least 95% psychology. Before you can become an athlete, you must decide that you want to become an athlete.

You also decide which sport, how serious you want to be, which sacrifices you are willing to make, how motivated you become, learning to focus and find the groove, learning how to train and compete, discipline, strategy, tactics, decisions, and many other parts of sports which are all psychology.

Champions

Contrary to what the media would have you believe, when I was coaching, I didn't take my athletes down to get their DNA tested to see which were going to be good racers.

I watched and listened to their actions and words to see how they think. I watched their responses to my teaching and instruction to see how they think. How you think will determine how you will train and race and how you train and race will determine whether you become a champion.

What did I watch for? I watched for enthusiastic and dynamic individuals who were open to learning and instruction. People whom I had to hold back to keep from over training. Riders who loved the battle and were not afraid of making mistakes. Racers who could learn to think in the chaos of a race

and focus on doing the job one pedal stroke at a time. People who would go to bed early and miss the party to be ready for tomorrow's race. People who would sacrifice for their dream at the drop of the hat. People who love bike racing with a passion. People who are aggressive and race hard long after they are tired.

It is much easier to teach you how to train and race than to teach you how to think like a champion. But you can learn how to think like a champion.

Intelligence

Bicycle road racing is not for stupid people. You are playing high speed chess in a swirling pack of up to 100+ riders, all of whom want to beat you and are racing back at you. They are thinking to beat you and you have to out think them.

Bicycle road racing is like playing team chess against up to over 20 other teams at over 35 miles per hour while navigating an infinite variety of courses and race formats. It is a combination of chess, marathon running, and car racing.

If you don't learn to think right, you won't win. Most of this book has to do with learning to think right.

Differences

I have learned that there are definite differences in how various groups of people think. Coaching Men and Women, Juniors through Master's, and beginners to pro's all at the same time was a fantastic learning experience. I was able to make a comparative analysis between them all at the same time as far as psychology, training, and strategies.

Most women learn to use the complex team tactics two to three times faster than most men. Most men automatically race more aggressively and, therefore, develop faster physically than most women. Juniors do what you tell them to do with very few questions and most adults regularly ask why. A coach will spend most of his time teaching women to race aggressively, men to think while blasting away, and answering adults' questions. Juniors are easy to coach until you have to deal with their parents.... who, with less training and experience, know more than any coach.

The Best You Can Be Is The Best That You Believe You Can Be!

It is not humanly possible to push yourself harder or farther than you believe you can go. If you believe that the best you can be is a Cat 3, then you are right. You cannot be better than a Cat 3.

If you believe that the best you can be is a pro, then you are right. You cannot be better than a pro. There are many things, which can limit your athletic potential, don't let your mind be one of them. **NO ONE** can tell what your maximum athletic potential is until you try. Not even you.

That is why we have competition, to find out. Believe in yourself even if no one else does.

The Mind

To properly understand the human mind, you must study it both as a part of the total being and separately from the body. You will find that the weakest part of a person is the mind. It is easier to beat the mind than it is to beat the body. Since the mind drives the body into motion and the body can do nothing unless told to do so by the mind, then, **if you beat the mind, you don't have to beat the body.**

When a person's mind gives up, his body also quits the competition. Most of the time, the last one to quit wins.

In over 40 years of sports, I have seen it happen so many times that two people go to blows at the end of an athletic event with both pushing as hard as they can. Suddenly, one quits and the other wins. After the event, the winner approaches the loser and says, "I sure am glad you quit when you did because, if you hadn't quit, I would have." Always remember that and be the last one to quit.

I always taught my racers that, when you are going as hard as you can and don't believe it is possible to hurt more, attack and, most of the time, the other person will quit because they are probably hurting as much as you. If they are hurting and you attack, the tendency is to believe that you are not hurting and quit. It works almost every time.

A great example of this is George Mount in the Canadian Olympic Road Race. There were eight riders in the winning break when one of them attacked on the last hill of the race and won. After the race, George stated that any of the eight were capable of winning the race but seven of them decided they didn't want it that much when the eighth rider attacked because they were tired. But the eighth rider was also tired. The seven quit when the eighth attacked. He beat their minds and didn't have to beat their bodies. Their bodies were capable of winning the race but not their minds.

The weakness of the mind is most significant in training. The strongest mind goes out in the cold and wind, pushes a little harder on sprints and intervals, and has the discipline to make its body the body of a champion.

When I was coaching, I got a call from a racer who was looking for a coach. He said he needed a coach to call him early in the morning and get him out of bed to go training. I told him that if he didn't have enough desire or discipline to get out of the bed to go training, then he was wasting his time

and my time because he didn't have enough discipline to push that little harder which it takes to become a champion. Was I also supposed to call him during the race to wake him up so he could attack?

You Have To Think Like A Champion To Be A Champion

Another aspect of psychology is perception. I had a woman racer who made all of my weekly lectures, rode the races, believed she was doing everything like I was telling her, and still couldn't improve on climbing.

I told her to go as hard as she could for short distances on the climbs to improve her climbing speed. She insisted that that was exactly what she was doing. Then, one day, I rode with her. Her perception of going as hard as she could was very different from what her body could actually do. She thought she was going as hard as she could and refused to believe otherwise. She could not grasp what sprinting really is.

I have found that 60 people could sit in on the same lecture and leave with 60 slightly different perceptions of what was taught. Because of this, I regularly rephrased my statements and watched their faces to see if just one person didn't understand.

I found that I had to state the same thing one way for Men, another way for Women, and another way for Juniors to get the idea across. Even then, there were individuals who had to have it said a different way. I would later find out that others still had not understood and had to first try it and get immediate feed back at a race.

Using Their Minds Against Them

I have learned that we humans are surprisingly predictable. You can use this to your advantage. You have been taught in cycling by all of those around you that, when a certain situation occurs you do a certain thing. This

teaches you to think and react in a very predictable manner. Therefore, if you want to win a race, start at the finish and work your way back.

For me to win this race, what do I want to be able to do at a given point in the race? For me to be able to do that thing at that point, what condition must exist at that point? For that condition to exist at that point, what must my competition do prior to that point? For my competition to react in such a manner, what must they first think? What can I do that will cause them to think what I want them to think so they will react the way I want them to react to create the desired condition at the time I want to make my winning move? (You may have to read that one two or three times.)

I call this taking control of your competition's mind and using it to defeat them. It really works and, as you go through the strategies, tactics, and blocking, I will show you how it works. You'll love it. It always amazed my racers at how easy it was.

To a lesser extent, the pros use this to predict or see when it is time to make the winning move. Often, the best pros know what you are going to do before you do and use it against you. The better you learn to use it, the more you will win.



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Part I • Chapter Two

Losing Races

Losing is Learning, Winning is To Have Learned

We don't like losing and we shouldn't. But we do need to use losing to improve ourselves. Losing is one of the best teachers in life and, if you'll listen to her, she will teach you what you need to know.

When I was coaching, I had my riders focus on self-improvement. Whether they won or lost was not as important as to keep improving. It is only common sense that you will only improve so much before you just begin winning by being in good enough shape and racing right. It works.

I had complements from athletes who had been in other sports all of their lives and said that they had never seen a coach use such little pressure on the athletes and have such good results.

The only time I got mad at racers was when they rode stupid and knew better. Then I would ream them out so they would never forget the lesson and not make the same mistakes again. Most of the time, I used weekly lectures, riding clinics, and coaching at the races to teach. How can you chew on someone for doing something that they didn't know about? But after they had been taught, practiced it in races, shown that they knew better, and then did it, then it was time to ream rear. That message always stuck and was warranted.

I always had my riders be aware of how far they were from their goal but not to focus on how far they had to go. That is very negative, especially for beginners who have years of training ahead of them to achieve their goals.

Instead, I had them focus on how much they had improved which is a more positive focus and more motivating.

With a positive focus, it is much easier to criticize your own racing and learn from your race losses. By learning from their losing, they could tell whether their loss was because of fitness which would take time and miles to remedy or because of something which could be fixed more quickly.

In my weekly lectures, I always used each rider's mistakes as part of my lectures so that everyone would learn from the same mistake instead of having to make that mistake themselves in order to learn the same lesson. This helped everyone learn to use losing as learning and that losing is just part of racing and part of being human.

This also taught them to not be afraid of making mistakes because they saw that everyone who was trying made mistakes. I regularly told them to not be afraid of making mistakes (unless they really knew better) because, if you are not making mistakes, then you are not trying.

It is just as important to teach racers what not to do, as it is to teach them what to do. We need both lessons. Losing was a very valuable tool in my program and brought about the results we enjoyed so much, called winning.

I strongly disagree with this mentality of "no one loses and everyone wins." They do this to protect their children from the "trauma" of losing. They are afraid that if little Johnny or Jamey is confronted with losing, they will become traumatized, go psycho, climb a tower with a gun, and start killing people. Give me a break. Out of all of us athletes and coaches who have lost one or more events, how many of us have never gone psycho and started killing people?

It is very important for us to learn to deal with losing, learn from it, and improve ourselves when it is only a bike race or ball game. Can you imagine

little Johnny or Jamey when they are suddenly confronted with losing at getting a job needed to pay rent, buy a car, or send their kids through college. I would much rather my child learn to deal with failure from a sporting event as a child and learn how to use that loss to make themselves better and more competitive than to learn it when going for a job as an adult.

Besides, how can you possibly learn from your losses if you are in denial about losing in the first place. You'll go off in your delusion that, in 100th place, you still won, never analyze your loss to determine the reason why, and not improve.

The hard, cold truth of life, and this is especially true in pro racing where only the winner makes the front of the magazine for his sponsors, **one rider wins, everybody else ties for last**. If you think this isn't true, sit down with two pieces of paper. On one, write every Olympic gold medal winner you can think of without looking any up and on the other piece of paper, write every silver medal winner you can think of. Now, compare the two lists. You can talk all the pretty philosophy you want and tell me that you are not "that way about winning." The truth is that reality bites. No one remembers more silver medalists than gold medalists.

Losing is learning, winning is to have learned.



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Part I • Chapter Three

Understanding Pain

Understanding Pain

The body has a very intricate and effective communication system that runs from the body to the mind to tell the mind what is going on in the body. We call this the nervous system. One of the messages regularly sent from the body to the mind is called pain. The pain is meant to tell our minds that something pretty drastic is happening to our bodies.

As far as an athlete is concerned, there are two types of pain. There is the type of pain, which tells you that there is an injury, illness, or pending injury. We need to listen to this type of pain to prevent permanent injury. You don't want to ignore this type of pain very long. This type of pain can also tell you when you have bonked or are dehydrated. You need to listen to these symptoms and act accordingly. You should seriously consider stopping and getting help to recover or re-hydrate as soon as possible.

The other type of pain tells you what is going on in your muscles during physical exertion. It tells you whether you are functioning aerobically or anaerobically, how hard you are working in relation to your fitness level, when your fitness level has changed, and if you have gone beyond your fitness level.

Our nerves have a threshold for message transmission. We call this a pain threshold. It takes a minimum stimulation of the sensor nerves to cause them to transmit a message back to the brain. We have known for a long time that this threshold increases as your fitness level increases. This means

that it takes more of the same stimulation to cause the nerves to send a message of pain.

One thing that most people don't know is that as your fitness level increases the pain threshold of your nerves increases and it also changes the message that is sent. A very fit pro does not get the same pain sensation that an amateur does.

When a beginning level amateur works hard enough to feel pain, the pain is very sharp. As your fitness level increases and your pain threshold increases, the pain becomes increasingly dull in nature until it reaches a point to where most of what a pro feels is a feeling of extreme fatigue.

It would not be possible for pro's to endure as much pain as they do if the sensation were as sharp and biting as it is for amateurs. We would not be able to condition beyond a certain point if the pain sensation did not change. This should give you amateur's hope for the future. Don't give up.

Focus and Pain

Over 30 years ago, I learned something very interesting about pain on a training ride. I had broken away from George Gamble and some other riders for an attempted solo. Remember that George was a former British National Time Trial Champion and nobody in New Mexico at that time could out run him one on one.

George broke away and was quickly pulling me in while my legs felt like they would break with any next push on the pedals. I looked back at him, said no, and attacked. The pain went away and I disappeared over the horizon.

When I did that attack, the pain already in my legs and the increased effort must have caused an increased endorphin dump in my body, which naturally anesthetized my body against pain. After that, I began to study and learn

about pain and pain control and learned to use it to control my pain sensation.

There are several things, which effect your pain sensation. As stated above, fitness level effects your pain sensation and, therefore, affects your pain control. The more fit you are the easier it is to control your pain.

Another factor that is very effective in controlling pain sensation is focus. The more you focus on your pain, the more intense it seems to you. Obviously, the less you focus on your pain and the more you focus on the race, strategy, pace, and etc., the less intense the pain will seem.

Now, how can I use this to my advantage? If I can decrease my focus on my pain and increase my competitions' focus on their pain, I can make them want to quit more than I want to quit. You use their minds to beat them by understanding pain.

One way to do this is to simply ignore your pain and fatigue sensations by focusing on your bike race. Keep your focus on the race activity, strategy, where you are in the race, and other race business. This is called keeping your head in the race.

The other way is to increase your competitions' awareness of their pain sensations. You do this by attacking and riding hard when you know your competition is hurting. Focus on their pain and not yours and on increasing their pain to make them want to quit more. You're only going to make them want to quit so much and then they will quit.

I taught my riders to use this well enough that several people told me that riders from other teams had told them that they hated to see my team show up at a race because it meant they were going to hurt. I call it racing mean.

I learned as a kid living in really nasty transient neighborhoods and doing a lot of street fighting that the first and most important rule to fighting is, **when the fight starts, make sure you're the meanest one there.** If you focused on not getting hurt instead of on hurting the other guy, you got your butt whipped.

Focus on hurting the other guy. It works.



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Part I • Chapter Four

Quality Psychology

Quality Psychology

In this chapter, I want to take the concept of **"the best you can be is the best you believe you can be"** even further. One of the courses I studied in college had to do with the history of sports from several aspects. The first was the founding and developing of sports or how a sport matures from an organizational and administrative basis. That is another story.

The aspect I am concerned with here has to do with the growth of the sport from the perspective of athletic development. In other words, how the sport matured from the aspect of quality of performance for the athletes.

In studying this aspect of sports history, I noticed something to be very true for all records in all sports. Each record would hit a "barrier" where everyone thought that it was humanly impossible to go beyond that point. That record would stay at that point until someone came along and questioned the common "wisdom" of the experts. They would come to the conclusion and belief that the barrier could be broken. That athlete would break the barrier, others would realize that the barrier was self imposed, and follow through the barrier.

The question here is, **"Are you a leader through barriers or a follower through barriers?"**

The mile is one of the best examples for this essay. By the 1930's, they had begun to believe that it was not possible for a human to break the four-minute mile. It had become a barrier in the minds of almost everyone to the

point that anyone who said that someone would someday break the four-minute mile was mocked. Finally, someone did break the four-minute barrier and everyone else followed him through the barrier.

Today, on the world scene, if you can't run a mile in less than four minutes, you can't run a mile. The last time I checked the world record for the mile, it was somewhere around 3:42. That is a long ways from a four-minute mile.

Most of the experts today tell you that these milestones in sports are passed because of improved training technology. I disagree. I have found that these milestones being passed has much more to do with psychology than exercise physiology. As a matter of fact, I believe that the developments in exercise physiology are largely brought about in response to sports psychology. The athlete or coach begins to believe that the athlete can be better and begins a search for a significantly different training program to make that athlete better. It is that search for improvement, which results in the improvement.

For over 30 years, I have asked the question, "What if someone in the 1930's believed that, we could not only break the four minute mile, but that we could also break the 3:50 mile?" I believe that, even if they had never broken the 3:50 mile, the "higher" focus of attempting to break the 3:50 mile would have definitely pushed them well beyond the four-minute mile.

It is this higher focus that I have studied for over 30 years and learned to use in my coaching.

The Higher Focus

Sports history teaches us that athletes will be better 20 years from now than they are today. Most experts try to explain this with developments in exercise physiology. I believe it has much more to do with sports psychology and will prove it.

The way athletes have always and still do think and focus is on beating the current record or top athletes. By doing this, they limit their athletic potential to either the same or just a little higher level of athletic performance. Because of this mentality, our athletic performance creeps up over a period of decades. We, as a species, are letting our minds slow our progress.

Over 30 years ago, a Swedish Exercise Physiologist, Heming Atterbom, PhD, taught me that the Swedish people have a saying that, **"To reach the tree tops, you aim for the stars."** I have considered this saying in relation to sports development.

What if the athlete, instead of training to beat today's athletes and records, looked 20 years into the future at where athletes and records will be and trained to beat those athletes and records. I believe that is how we get the really great athletes like Eddy Merckx, Muhammed Ali, Babe Ruth, and Jim Thorpe. I believe that these people do not permit their minds to limit their performance based on the performance of contemporary athletes but push to a higher performance with a higher training and competitive focus. They literally develop their performance to be anywhere from 10 to maybe 50 years into the future.

Therefore, to me, it is only common sense to develop a higher focus for your own training. If you want to beat the existing hour record, you don't set your focus to beat the existing hour record. You set your focus to the higher focus of beating the hour record 20 years from now. And it doesn't matter whether you ever achieve that goal as long as that higher focus pushes you past the existing hour record.

If you want to be the best today, you don't train to beat today's best. You train to beat the best 20 years from now. That higher focus will take you well beyond today's best. Mentally, you don't let yourself get caught in the

trap of worrying about trying to beat today's best. They are only a stepping-stone to the future and the training to achieve that future.

If I were a miler in track and field, I wouldn't train to break the 3:42 mile. I would train to beat the 3:30 mile knowing that the higher focus would carry me beyond the 3:42 mile and my competition. This would make me one of the greatest milers ever. It doesn't matter whether I ever break the 3:30 mile that is only for training and competitive focus.

It is my star I am aiming at to reach my treetop. Think about it. It works.

The best you can be is the best that you believe you can be. Where do you limit yourself?

How Does This Apply To A Weekend Warrior?

So, how does the average racer or weekend warrior who doesn't intend to go pro use this concept? Simple, if you are a cat 4 wanting to move up to cat 3, you train to beat cat 3's and you will beat the cat 4's. It should only be common sense that, if you can get strong enough to just compete with cat 3's, you will be strong enough to beat cat 4's.

In my coaching, I never trained anyone to be an amateur. First, you are an amateur racer already. You became an amateur the day you decided to start racing or tried your first bike race. Why should I train you to be what you already are?

Second, if I train you to be a pro, you will learn to think and act more like a pro. You will discipline yourself well enough to use the more sophisticated pro tactics and train in a more professional manner. Even if you are a weekend warrior who will never go beyond cat 2 or cat 3, you will be a much better cat 2 or cat 3. This really works.

I regularly got compliments from other riders, even pro's, that my cat 3's and better had better riding discipline, team discipline, and team tactics than a lot of pros. They were much better cat 3's because of it.

I never told a rider to move up until he or she was definitely ready to compete at the next level. That meant they could go to the front of a pack at the next level and race there. I never permitted a rider to move up if it meant they would just be hanging onto the back of the higher pack trying to finish. That is miserable and the racer will not be able to continue fitness development by attacking the front. I used cat 3 racing to prepare my riders for cat 2 racing. If they couldn't race at and off the front of a cat 3 race and still win, they were not ready to move up to cat 2. Period!

When my racers were racing cat 3, they were only training to become cat 2's. They knew they were going to beat cat 3's, no problem. And when you realize that cat 2's ride with the pros and cat 1's, that means they were in training to become good enough to at least ride at the front with the pros. When a rider was good enough to move up, I could move him up on command **BECAUSE HE WAS GOOD ENOUGH**. It works.

If you are a weekend warrior and you want to be good enough to be a good cat 2 or cat 3, set your focus on beating the next higher category. That higher focus will carry you to the top of your desired category. It works.



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Part I • Chapter Five

Sleigh Driver

Sleigh Driver

I will repeatedly state throughout this book that sports psychology is and will be your most valuable tool in sports. This chapter is an example of how to use psychology as a tactic or strategy.

Let me say before we go any further that I normally like to cheer an underdog, coach an underdog, or be an underdog because of the extra challenge. I find it very inspiring and exciting to be that underdog. Anyone can be a favorite or coach a favorite and win. Only the best can be the underdog or coach the underdog and win. Nothing turns me on more and that is one of the many reasons for this book. I want to help some under dogs have a chance at beating some of the big boys. Just the thought makes my blood boil.

Mike Dines was the first person to make me aware of sleigh driving. He told me to be careful about following the instructions of others during a race. You see, when you are focused intently on something like a bike race, a command, instructions, or even a suggestion will process into your subconscious mind and, before you know it, you will be doing what you were told to do.

It is very normal and only experienced racers are aware of it. If you catch the pros at just the right moment, even they will have a tendency to do what you tell them to before they realize they are doing it. The power of suggestion is so incredibly strong and a very effective tool.

So what is a sleigh driver? It is a person or group of persons who sit behind the paceline in a peleton giving instructions for the riders in the paceline while "riding the sleigh" or getting a free ride.

How does it work? You position just behind the paceline and call out instructions such as speed up or slow down. All but the most experienced riders respond and, if you really want to make it work, have one of your teammates in the paceline, working and giving instructions also. The riders who are most easily driven are either rookies or people who have tremendous respect or fear of you. Anyone who sees you as an authority figure.

The first time I saw sleigh driving being used was in a race between Chicago and Peoria, Illinois. John Howard and some other top riders were sitting about ten to twenty riders behind the front and calling out instructions to much less experienced riders in the paceline. Every now and then they would yell out to pick up the pace and that the pace was too slow. They were laughing and playing with a group of less experienced riders who had worked their way into the paceline.

I watched them work the paceline and laughed at the scene for a while before I decided to help the less experienced riders. I moved into the paceline and worked my way to the front. When I got to the front, they started yelling about the pace being too slow and that I should pick it up. I yelled back; "If you don't like the pace, you know where the front of the pack is!" The fun was over and we went back to racing.

After I retired from serious racing, I would train for about 2 to 6 weeks just before states so I could sit in the back of the pack and tell jokes with some of my old friends during the start of the state road race every year. One year, the defending state champion was a rider who belonged to a team that was really the only well organized and structured team in the state. They tended to dominate the races.

The strategy they had used the previous year to get the defending champion the title was for him to take an early flier and then the team completely shut down the front of the pack until he was so far up the road that the pack just couldn't catch him.

In this particular year when he was defending his title, only he and one teammate showed up for the race. They felt they could control the pack well enough to do the same thing with just the two of them. He took a flyer in the first ten miles of the 114-mile race while his teammate shut down a pack of much less experienced individuals with no team structure at all!

It was promising to be a very long and boring race so I decided to liven it up a little by playing sleigh driver. I set up a gatekeeper and slid in on his wheel. I then started calling out instructions for a paceline and got it moving. The offensive teammate of the rider on break countered this by working into the paceline and slowing when he got to the front. I countered by teaching the others to just ride around him as soon as he slowed down without letting him break pace.

He countered by pushing and shoving in the paceline. This offensive teammate was one of those riders often used by teams to intimidate other riders. He pushed one rider who started to back off so I yelled, "Don't let him push you around. He is just as afraid of crashing as you are." Amazingly, the rider pushed back and the offensive teammate backed off. He became as afraid of crashing as the other rider because I told him that he was. The power of suggestion is really incredible.

The offensive teammate backed completely out of the paceline and I had complete control of the race as the sleigh driver. I told the paceline to keep the rider on break at 40 seconds to let him cook. When necessary, I told them to speed up or slow down while I watched the rider on break. As soon as I saw the rider on break hit the wall, I told them to get him and then set

back and watched the race until I finally got dropped. It was fun and they had a new state champion that year.

As a racer or a coach, you need to be aware of this phenomenon. It can work against you or for you. I often used things like this if I were in a race without a team while riding against teams. I would use psychology and tactics to "abduct" other team's riders and get them to do my teamwork for me.

Learn to use other people's minds to beat them. Sometimes all you need is a subtle suggestion like, "Have you tried..." "or "You might try..." " It works.



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Part I • Chapter Six

Lapping Psychology

Lapping Psychology

There is a tremendous amount of psychology involved in lapping the field whether in a Criterium or a track race. For this chapter, I will refer to both.

I don't know how many times over the years I have heard less experienced racers make comments showing their lack of confidence in their ability to lap the field. Their comments always show their misconceptions about the task.

The most common misconception is their understanding about how much of a gap they must bridge to lap the field. For example, on a one-mile Criterium course, most people think of the distance required to lap the field as being one mile. That is incorrect. The distance required to lap the field is the distance from the front of the peleton forward to the rear of the peleton. You have lapped the field when you can begin drafting the last person in the peleton, not the first person in the peleton.

Therefore, the distance required to lap the field (the lapping distance) is equal to the size of the course minus the size of the peleton. In a Criterium on a one-mile course with a field of 100 riders, the distance required to lap the field is much less than it is on the same course with a field of only 50 riders. It is also important to know that the distance required to lap the field is greater when the pack is going slow and is bunched up than when it is going fast and is strung out.

Of course, it is also more difficult to catch a pack that is moving faster so there is a trade off which pretty much equals out. It should also be obvious that there is less lapping distance on a shorter course.

Over the years, I have closely studied this phenomenon. I have noticed that a pack of 100 riders strung out single file will cover a little over one quarter of a mile. Therefore, the distance required to lap a 100-rider peleton strung single file is less than three quarters of one mile. This is almost 30% less than most people think, which makes it easier to lap the field than most people think. The pros know this.

On a 250 meter Velodrome with a pack of 20 riders strung single file, the pack will stretch to about 150 meters. This means that only 100 meters is required to lap the field. With the same pack on a 333.3-meter track, you have to cover an extra 83.3 meters, which decreases the number of riders who can lap the field by about half to two thirds.

At Encino Velodrome in California (250 meter track), we had a field of 29 riders for a scratch race. We did a standing start from the rail, the riders at the front of the rail understood this phenomenon, and used it to eliminate much of their competition. Unfortunately, I was the last rider on the rail and had not considered their attack at the start before the start. As I took my place on the rail I was surprised at the size of the field for a standing start. I had thought the officials would either split the field or have a rolling start. I knew I was in trouble as I watched the front riders take advantage of this.

The front riders attacked at the start to lap as many riders as they could as quickly as possible. By the time I was able to release from the rail, the first rider was in turn four. I was starting the race almost a full lap down with lapped riders being pulled.

So I waited until the rider in front of me had dropped down below me and attacked over the top of all the riders in front of me. I spent the entire

scratch event sprinting by racers on their right and using their side draft to help me get to the front. The first half dozen riders were lapped before they could complete their first lap and the pack stayed strung single file for the entire race.

I reached the second rider on the front of the peleton with two laps to go only to see four riders on break about 60 to 70 meters off the front. I didn't even slow down when I reached the front, instead, I immediately attacked off the front and bridged half the gap to finish fifth after putting over three fourths of a lap on everyone. It is very important to understand the significance of the lapping distance, especially in track racing.

Another important problem that most riders have in trying to lap the field is that they wrongly believe that the peleton will chase them at full intensity as long as they are off the front. See my chapter under strategy and tactics where I talk about peleton evolution. You will see that the peleton chasing as hard as possible for the entire race is a misconception.

Then people fail to understand the real strength of lapping the field. First, when you have lapped the field, you can sit in and draft the people who are chasing you. You get to rest and recover while they work to catch you. All you have to do to win is to keep them from lapping the field. You might call this a little maintenance defensive riding.

They can get off the front as long as you ride hard enough to prevent them from getting far enough off the front to lap the field. Lapping the field automatically eliminates everyone who has not lapped the field. This is why the pros ride so hard to lap the field. If you are a lap up, it doesn't matter who wins the field sprint. You still win the race.

When attempting to lap the field, it is very important to focus on the fact that when you catch that last wheel in the peleton, you get to draft and rest.

This means that you can ride harder than most people think and increase your chances of lapping the field. The pros know this and use it.

Now put all of this together and throw in team tactics where you have teammates slowing the peleton to increase your chances of lapping the field. It starts sounding much better than you originally thought, doesn't it?

Don't miss my chapter on Lapping Tactics in Part II; Racing Strategy.



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Part I • Chapter Seven

Shadow Rider

Shadow Rider

There are two basic aspects to developing as a competitive or recreational athlete. These are fitness development and learning. It should be common sense that you will only develop so much fitness and learn so much and you will just simply begin to consistently win.

This book is designed to help you in both areas but sometimes you need to learn how to use the practical application of what you are learning. There is a technique I taught my riders which really helps with this.

You should know by now that I believe in using races for fitness development. It is sacrificing one or more races to help you win many more races in the future. I also believe in sacrificing races for mental development or experience purposes to help you win more races in the future.

To do this, I teach a technique I refer to as shadow riding.

Shadow Riding

There are a number of reasons to use shadow riding. You may simply wish to learn more from your competition, you may have trouble cornering, riding in a pack, with sprint finishes, climbing, or any number of other problems. It is something you should do for at least a while after being upgraded to a higher category. Basically, you use it for intellectual, technical, and strategic self-improvement by learning from your best competition.

The technique is quite simple. First, you must set in your mind that you are not going to think about winning for this race. This psychology is very important because it clears your mind of any strategic or tactical distractions, which will limit your learning. You must be completely focused on the task of maximizing learning for this race.

Next, you select a top rider at the race who is very good at something that you want to improve on such as cornering, pack riding, tactics, or sprinting. Then you become that rider's shadow for the day. You will position on his wheel and follow him everywhere he goes except out the back of the pack or down in a crash. If you briefly lose his wheel during the race, no problem, just get back on it as soon as reasonably possible. You will lose his wheel a few times during the race.

You do want to be sure to not just sit and stare at his rear wheel for an entire race. What you want to do is to watch him and his actions and positioning in relation to what is going on around him. If you are following a rider to learn better cornering, then you try to mirror his actions and positions while following him through corners.

Study how he sets up for the corner, the line he takes, his body position, whether he pedals, and how he comes out of the corner. If you are having trouble cornering, be sure to notice that the best riders relax in the corners. Not relaxing in the corners is the most common cause of losing ground in the corners. Tensing up will cause you to pull hard to the outside.

Let's say that you always lose your sprint finish against other riders. If you sacrifice an attempt at winning a race or sprint that you know you won't win because you don't know how to sprint anyway, is that really even a sacrifice? Of course not, it is an investment in your future. Plus, when you play shadow rider for sprint finishes, you can be more flexible permitting the race format to dictate which events you will play shadow rider. You ride the race to win and then if it comes to a sprint finish, you simply become

shadow rider behind the best sprinter for the final 3 to 5 miles of the race. You watch where he sets in the pack, when he moves for position, where he positions, and when he makes his final move.

Note: You should play shadow rider behind a number of different riders to learn different tricks and habits. Then you compare the differences and similarities. You should play shadow rider in a number of different events and in different types of events. You will be surprised at how quickly this can improve your riding or racing

You should also ride behind the same rider on training rides and in races. You will find that the best riders don't ride the same in both types of rides unless they are using a race for training. This will also help explain why you may be able to finish ahead of that rider in a training ride but can't beat them in an actual race. The best riders train for fitness and race to win. That requires different riding techniques.

If used properly, shadow riding is a very valuable learning tool, which can improve your cycling. You will learn a lot from it but always remember that no rider is perfect. Some are just better than others. Be sure to look for what riders do wrong as well as what they do right. Don't copy what they do wrong no matter how good they are.

Even with recreational cycling, shadow riding will help you improve your riding. Most experienced recreational cyclists prefer to sit on a very good, experienced, upper level racer's wheel whenever possible because they are so smooth and much easier and more fun to follow. Don't just enjoy the smooth ride. Learn from it to improve the quality of your riding. Don't be afraid to ask the racer an occasional question.

But on the other hand, don't spend 100 miles of asking him questions. Remember that he is also out there to enjoy his ride.

Another way that shadow riding will help is in relaxing. One of the most common causes of making mistakes in such things as cornering and sprinting is getting too tense.

By focusing on learning from the other rider, you will ignore the things that have caused you to tense up and you will suddenly find yourself doing very well at something you were terrible at. This will improve your confidence and performance.

Plus you will help improve the ego of the person you are following because it will make them think they are smarter or more significant than they really are. :-)

For better or for worse, you are the sum of the little things you do.



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Part I • Chapter Eight

Scientific Essay

Scientific Essay

The reason for this particular essay is to get you to think and realize something very significant about your potential as an athlete. I want you to think this through very thoroughly.

I am going to give you a homework assignment. I want you to write a five-page essay providing the scientific evidence that proves beyond any doubt that **YOU** cannot win the World Championships, Tour de France, or any other event that you would like to win. I want you to research what it would take to scientifically prove beyond any doubt that **YOU** cannot achieve your desired goals, no matter how big or how small they are.

What you will find is that we don't even know enough about the function of the human body and mind as an athlete to be able to prove that any individual person cannot achieve their desired goals.

In spite of this, there are many Exercise Physiologists who **THINK** they can determine which athletes can and cannot win. They have their little rules, which they believe can prove who can and cannot be a champion in any sport. But, what they often fail to realize is that, for every one of their rules, we can show them exceptions to that rule.

A really great example here is Leonard Nitz who was the best racer in America. They tested the top 30 racers in the US in an exercise physiology laboratory to determine their bike racing potential. They were surprised to

find that, according to their rules, Leonard shouldn't even have been racing bikes much less beating everyone.

It should be common sense that, if there is even just one exception to a rule, then that rule cannot definitely eliminate anyone from being a potential success because you could just as easily be the second exception to that rule. Therefore, even if the scientists did their best research on you, they could not tell whether or not you will succeed at your desired goal. It should be common sense that, if no one has done any research on you, then no one should be able to tell whether or not you can succeed at your desired goal.

In doing your research for this essay, I want you to realize that, if the scientists with all their research can't tell whether you can succeed, then how can anyone else tell whether you can succeed? The next time someone pulls the, "**Who, you?**" routine on you, ask them for the scientific research and evidence to prove that **YOU** cannot achieve your goals. If their response is that it is their opinion that you cannot succeed, ask them what scientific evidence is their opinion based on.

I want you to realize that, even today with all we know about science and training, the **ONLY WAY** we can tell whether or not anyone can succeed at their desired goal is for that person to try. If you don't try and give it your best effort, then it is simply impossible for us to ever know whether you could have succeeded. In other words, the sports event is still the best way and only way we have of finding out who can and who can't.

A second thought here is that failing once or twice still does not prove whether you can or cannot succeed at your goal.

The most common pathway to the top of the athlete's mountain is still to try, fail, learn, improve, try again, fail again, learn some more, improve some more, try again, fail again, learn even more, improve even more, and so

forth until you finally learn enough and improve enough to eventually succeed.

I have learned that life is a highway that starts out very wide and heavily traveled. As we approach our mountaintop of success, the highway narrows and more and more traffic quits the journey and exits the road. Towards the top of the mountain, the road turns into a narrow trail with much, much less traffic. At the top of the mountain is a small brotherhood or sister hood of champions. These are the few who didn't quit trying, failing, learning, and improving until they achieved their goal.

The worst failure is the failure to try.

The second worse failure is the failure to learn and try again. Where you quit is where your journey up the mountain ends.



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Part I • Chapter Nine

Damage Control

Damage Control

While watching the Winter Olympic Games last night, I saw one of the most pitiful sights I have ever seen. There was this pretty, young athlete cowering in the snow against the safety fence on the Super G course after she had laid it down in a panic.

This was after I had been told that there were psychologists working with her to help her overcome her problems with crashing out of events and that she had not finished any of the last eight World Cup events in down hill skiing.

The only thing I could think was, "Who could do that to a young athlete? They must be monsters."

Her problems began at least three years ago and the shrinks have done everything wrong in dealing with her. If you think I am wrong, that picture of her cowering in the snow is the result of their work. While looking at her cowering in the snow, I dare anyone to convince me the shrinks and her coaches did the right thing. Obviously, they are miserable failures that have destroyed a human being.

First, I want to know what idiot coach took an athlete who is so stressed out that she has not been able to finish one of her last eight events and put her into the most stressful situation in the world, the Olympic Games. That was pure stupidity. The proper thing to do in coaching should have been done at least three years ago.

But, if I were to have been put in control of the situation just before the Olympic Games, I would have pulled her off the team, put her into a recovery program, and sent a younger skier to the Games to get some Olympic experience.

It is only common sense that a last place for a beginner is better than a traumatized DNF for an experienced skier. This action would have started the experienced skier on the road to recovery while getting a new skier moving towards a gold medal in the future.

This terrified and traumatized young lady is the result of terrible coaching and psychology.

This matter should have been nipped in the bud years ago when the first symptoms appeared. She is suffering from being over stressed and what we call crash punchy in cycling. When she first began to show signs of having trouble down hilling, they should have gotten her away from the sport, permitted her to relax and heal, and then gradually brought her back into the sport in a controlled manner.

I teach and have used rest cycles for decades. Most people only understand the physiological uses and significance of rest cycles. I have found them to be at least as important for Psychology.

I always kept an eye on my riders and, if a rider even began to show signs of burning out or having problems, I grabbed hold of the situation to solve the problem before it became serious by throwing a rider into a rest cycle and getting them off the bike.

When a rider begins to develop problems with cornering, you first instruct them in the proper cornering and relaxation techniques while working with them in a controlled clinic situation. If this fails to produce results within one

to two races, you yank them from competition, force them into cornering drills in a low gear to keep their speed down, and force them to sit back and relax **EVEN IF IT MEANS YOU START RIDING WITH THEM TO KEEP THEM GOING SLOW.**

The trick and goal here is to re-teach them how to enjoy and love the movement of the sport. In other words, you need to get them to relax and enjoy floating through corners at lower speeds. As they remain relaxed and enjoy the feeling of floating through the corners, you gradually let their speed come back up until they are flying through the corners.

If caught soon enough, this could still take weeks or months to get the rider back to form for competition. As serious as they let the condition get for the young skier, she may never recover well enough for competition and, if she ever does, it will take years to do the job right so she can enjoy the sport.

For such an extreme case, what they need to do is to admit to themselves that they may have permanently lost her as an athlete. Next, remove her from any form of skiing for at least one to two years. Then they need to have her make a list of a dozen sports she finds at least a little interesting and have her spend the next year trying those sports **IN A RECREATIONAL FORM ONLY.**

A reasonable amount of stress is good for the human body but, like everything else, too much is bad for you. An extreme amount of stress causes chemical imbalances, which can do permanent damage to the mind and nervous system. Therefore, it should only be common sense that the first thing to do when an athlete reaches such a high level of stress is to remove that stress and permit the athlete to heal. We call this rest and use rest cycles to achieve it.

Part of that healing process would be to get the athlete involved in something fun and relaxing like another sport or recreational activity. You

cannot permit them to do any competition until they show significant recovery.

After adequate recovery has been shown for a reasonable period of time (pending the level of damage done), you start them with drills at low speed to re-teach them to enjoy the basic motion, which originally caused the stress. You can best achieve this by creating little games, which cause them to go through the desired movements in a fun manner.

THEY MUST REMAINED RELAXED DURING THESE DRILLS AND SHOW ENJOYMENT OR BE REMOVED FOR MORE RECOVERY. No debate on this.

As the athlete recovers and shows clear improvement, you gradually permit the athlete to increase their speed over a period of days, weeks, months, or even years depending on how serious the case is.

For cycling, we have the added problem of having to corner in the middle of a pack of 100+ riders. You handle this by gradually increasing the number of riders they do their cornering with **AFTER THEY HAVE SHOWN RECOVERY.**

Teammates can be very helpful here. It is also important to understand that, when you begin increasing the number of riders when cornering, to drop the speed back to a comfortable level for that rider and not let the other riders bring the speed up too soon. Recreational rides or Saturday skill clinics are very good for accomplishing this.

With this young skier, I would start her back with slow recreational cross country skiing, then slow down hill skiing while floating the turns in play, and then gradually let her bring her speed up as long as she does not show any signs of getting tense when doing her curves. You have to enjoy plunging

corners before you try plunging corners in competition. If you are forcing your corners, you are asking for trouble.

It is very important to remember that some riders (pending how serious the case is) may never recover with some even having to leave the sport or find another sport. This is why it is important to catch these things as early as possible.

Remember, the most important rule in sports is, "If you don't love it, leave it."



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Part I • Chapter Ten

Motivation

Motivation

This chapter was written after a request by a racer. It has to do with the motivational problems faced in a difficult sport like cycling.

One of the first questions we have to ask is, "What motivated you to start racing in the first place?"

Most people are first motivated into bike racing based on the enjoyment of the physical and social sensations or pleasures of the sport. We enjoyed the sensation of what we considered going really fast, the bike handling, the improved fitness, and the basic social characteristics of the sport.

When you first started racing or even serious recreational cycling, you really enjoyed having a snappy, responsive racing machine under you. This is very much like climbing into a high performance car and revving the engine or speeding through some corners. That new and very rewarding sensation felt good every time you did it so you wanted to do it a lot more.

But there is a little problem with a sensation-oriented form of enjoyment. That problem is that we tend to become accustomed to any stimulus so that it doesn't feel as exciting after a while. But there are techniques, which can bring some of this back such as getting a "junker" bike to ride on short easy days or during the off-season. When you return to your pro bike, the increased response is more obvious and slightly new again.

Another way to handle this problem is to take off from racing and training for a while and do other activities. We call this cross training and cross training can be as important or even more important for psychology than for physiology. When you return to the sport, the bike feels snappy under you again and it becomes more fun to train and race.

Overtraining can cause several problems with motivation. The first is that your fitness drops and you don't feel so well or positive. You are still much more fit than years before but you **"FEEL"** down. It can also cause your mind and body to feel tired. A simple solution here is to take off for from a few days to a few weeks depending on how overtrained you are. Your body will recover from the overtraining, your fitness will increase, your body and mind will feel much better, and you will be more motivated to train and race.

The sociology can change causing you to lose motivation. Most people come into bike racing with one or more novice friends and you are just having fun. You ride, laugh, tell jokes, and horse around a lot. You make up sprints and games on the spot and PLAY at your bike racing. But your friends or their attitudes may change and become too serious or they may leave the sport and you find yourself riding with prudes. Suddenly the sport isn't the fun it was.

You may need to find new friends, check your attitude to see if you have become too serious, take some time off the bike, or even find a new or younger club with the attitude you enjoyed when you started racing. Coaching some of those silly beginners can do wonders for your attitude and return the fun to the sport.

I have learned in watching the pros that they play on their bikes a lot in training and racing. Very often, the best pros take their racing and training less seriously than amateurs. They are disciplined and work hard but that work is very often intermingled with play such as calling surprise sprints or

horsing around. I have watched top pro's chase each other and play tag in warm-up before a race. In other words, they still have fun with their sport.

I have noticed an interesting phenomenon in pro racing. You can tell when an outstanding pro is about to go over the hill in cycling by his behavior and attitude. If you see a rider who has started to lose the fun and enjoyment or has stopped playing when riding, he is about to stop those little fun jumps, sprints, and attacks that increased his fitness and timing and gave him the edge which put him at the top of the sport.

As his fitness drops off, his performance drops, then he doesn't enjoy the sport as much, he becomes depressed, it becomes more difficult to train as hard, and he starts snow balling downward in his racing. Unless he does something soon, his career is over. I have watched this happen for decades. Most people think these riders are physically burned out but it is the rider's head and not his body, which needs the help.

The best thing to do here is for this pro to take some serious time off from the sport. This could be from months to a year or more. Then he needs to come back into it as play and having fun.

This tends to be a particular problem when a rider has had one or more bad seasons because of injury or illness. Suddenly, the coach and manager get on them about their performance instead of helping them develop a recovery program and the pressure pushes the rider down even more. The bike isn't fun any more and it must stay fun for a sport that requires the miles and intense training that bike racing does.

Other things, which can cause this phenomenon for amateurs, are problems at work, family problems, financial problems, weather, and many others. The key is to develop an attitude, which returns the joy to the sport. Instead of seeing your sport as being so critical or a part of the total

problem picture, learn to see it as a brief escape from your problems and the stress.

Some times, you may have to find or create a more positive environment such as returning to recreational cycling for a while with some people you find fun to ride with. Or you may want to have yourself down graded to a lower category where it is easier to compete and, therefore, more fun. This should help you bring your fitness back up and make it possible for you to upgrade again but to fun racing.

Some times you just need to go ride the bike and enjoy it again or just go surfing or fishing for a while. If you are serious about your racing so that it has ceased to be a pleasant hobby, get another hobby to return some of the fun to your life. Do a little gardening for relaxation or learn to play a musical instrument, dance, or paint to relieve some of the stress you are putting on yourself to "make it" in cycling.

You have to keep your mind healthy too!



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Part II • Chapter One

Racing Strategy

Racing Strategy

It is crucial for you to understand that bicycle road racing is **NOT** an individual sport.

PROPERLY DEVELOPED BICYCLE ROAD RACING IS A TEAM SPORT, WHICH USES INDIVIDUAL TACTICS.

But even the individual tactics are made possible and supported by team tactics. To understand racing strategy, it is important to start with individual tactics because the team tactics are built on individual tactics.

I am the only person I know of to ever organize bicycle-racing tactics into offensive and defensive tactics. To me, this was only normal since most of the other sports I have been trained to coach also have their tactics categorized into offensive and defensive tactics. I have found that this system makes it much easier for racers (Europeans as well as Americans) to comprehend and change tactics during the race. At least try it and see if you like it.

Before we begin, I wish to state that **the best tactic in the world is simply to get stronger and faster than your competition and crush them.**

I call this the Eddy Merckx syndrome. Fitness development is your best long-term strategy.

Individual Tactics

Individual tactics are built around a combination of aerodynamics, drafting, and the fatigue characteristics of the human body in relation to fitness level.

If two riders of the same size are traveling at 25 miles per hour on flat ground with no wind blowing and the rear rider has his front wheel six inches behind the rear wheel of the front rider, the rider in the rear is doing 30% less work than the rider in the front.

At higher speeds or in the middle of a pack, he is doing relatively even less work. At slower speeds, the work difference decreases.

If you have three riders who are the same size and same fitness level riding under the same conditions as above and two of the riders are working together with the third rider riding by himself, the two riders will pull away from the third rider as their riding distance increases. To ride a rider off of your rear wheel under the above conditions, you must be at least 31% stronger than the rider on your wheel.

These are the fundamental principles upon which all racing strategies and tactics are based.

Paceline

Paceline is when two or more riders use the above principles to ride faster for a longer distance by taking turns "breaking wind" or taking short efforts on the front.

Each rider takes a short pull on the front, swings out, slows down, lets the other rider pull through at a steady pace, moves to the other rider's wheel, and rests and recovers at 30% less work so he can pull harder when he gets back to the front.

Normally, riders of equal strength take 25 strokes (revolutions of one crank arm) on the front. This will vary pending relative rider strengths and race tactics.

The Ideal Race

The ideal race has three steps to it. It starts out with the pack and develops to a small break off the front of the pack with all of the riders working together to gain as much distance as possible on the chasing peleton (pack) behind.

There is an unspoken alliance between the racers in the break to work together to eliminate the other racers from having a chance to win the race before they resume hostilities against each other. As soon as one of the riders believes that the peleton cannot catch them before the finish, the battle for first place resumes between the riders in the break. Then one rider will break away from the others and solo in for a safe and secure win. The last few miles of the race should be a victory ride.

The basic strategy of this is to work with a few to eliminate most of the riders and then eliminate the few.

It is generally understood that no tactic is good enough to beat you if the rider making the move is a quarter of a mile behind you at the finish line. Know that any rider who can stay with you can beat you.

Even the best sprinters prefer this break away strategy because your chances of winning a sprint in a pack of ten riders is ten times better than in a pack of 100 riders. Besides, in the pack of ten riders, the worst you can get is tenth. In the pack of 100 riders, the worst you can get is 100th. You choose.

Your chances of crashing or being boxed out of the sprint in the break are also much less.

But, you ask, "How can ten riders or less out ride 90 riders or more?" There are three basic reasons why this is not only possible but if you know how to do it, surprisingly easy.

These are peleton structure, peleton evolution, and psychology (there's that P word again.)

Peleton Structure

The pros know that never more than about 30% of a peleton is a major factor in a bicycle race. The promoters who understand this call the other 70% of the peleton "pack filler."

Most of the other 70% of the peleton fall into one of three categories. The first group consists of the riders who are sitting in to save it for the finish. They rarely, if ever, go to the front and do some work. Their legs are useless to the peleton for the chase effort.

The second group of riders in that 70% consists of the riders who are barely strong enough to hold on at the back. They spend the entire race hanging on hoping they can stay with the pack to the finish. You almost never see these riders at the front of the peleton either.

The third groups are a few good riders who have either been injured or sick and are trying to recover. They may be riding for an easy workout or trying to recover their strength.

As a matter of fact, there are never more than five or six riders who are strong contenders for any race including the Tour de France.

There are about five to ten riders who have a fair chance at winning and then about 10 to 20 long shots whom, if something strange happens, they could win

This fact is used by experienced racers to conserve energy and increase their consistency in winning by not chasing riders who can't win or are a long shot. They only ride against the hand full that are serious threats. Occasionally, this permits an underdog to win. But not very often. Know your competition.

Team racing uses these very principles and takes them a step further. If you are in a pack of 100 riders and only 30 will significantly contribute to the outcome of the race, you, as an individual, are racing against 29 other riders. But, if nine of those riders are your teammates who will work for a team win, you are only working against 20 other riders.

Team racing does two things. It eliminates some of the stronger riders from chasing you (your teammates) and provides you with riders who will interfere with the efforts of others, which effectively eliminates even more legs from the chase effort against you. Now you can see why team racing increases your chances of winning and winning consistency. Suddenly, we don't want this to be an individual sport, do we? Pass the team, please.

The main point here is that there are only so many workers in the bike race whom you will have to beat.

Another point of interest is that you will notice that most of the riders who are in the top 30% of a local pro-am race will not be in the top 30% in a national level pro-am race. Most of the riders who are in the top 30% of a national pro-am race will not be in the top 30% of an international pro race. This is very important to keep in mind when considering moving up to a higher-level team.

A team leader on a local team may only be a good domestique on a regional team and a team leader on a regional team may only be a good domestique on a national team.

You may want to remain at your level until you can prove that you are ready to be a team leader at the next highest level. I have seen a lot of riders go up a level for a year or so, struggle, not be very happy, return to the lower level, consistently win, and be very happy.

How is this significant to you as a bike racer? It means that you have to set your race strategy based on who else is at the race. If your team is a top five team in a local race, in a national race, you may be racing for a stage win, KOM, Points Leader, or to put your team in the top three to five on team GC.

Also, you'll set your strategy one way to beat a tough defensive team and another way to beat a tough offensive team. You have to include your competition in your team strategy.

Peleton Evolution

The pros know that the peleton goes through a number of changes during the race.

When the race first starts and the pack is still fresh, everyone who can and is willing to go to the front and help chase a break will help chase. As legs tire, fewer and fewer riders show their faces at the front. This means there will be fewer and fewer legs contributing to the chase as legs break.

The peleton will finally reach a point to where someone will attack and all the chasers are so tired they hesitate, waiting for someone else to chase. This is commonly referred to as the crunch and is where the "big boys" consistently make their winning move. When the break goes up the road,

there will only be a few riders in the peleton who are willing to chase and missed the winning break.

From here, the peleton evolves one more time. The few riders who want to chase will attempt to force the pace on the front but when they swing out for the next rider to take a pull, that rider will slow down causing the peleton to lose ground on the break.

This will eventually frustrate the few strong riders left in the peleton who will begin attacking in an effort to break away and bridge up to the break. Most of the time, this puts them in a catch 22. The tired riders in the peleton will chase the stronger riders in the peleton because the attacking riders are close but will not chase the winning break, which is much further away.

As riders fatigue, their ability to focus up the road decreases but they can still focus on the front or just off of the front of the peleton. This causes the riders to individually shift their focus from a break to the front of the peleton as they get tired and to race for what is left.

This constant attacking by the remaining strong riders in the peleton causes the other riders in the peleton to shift their focus from the break to the attacking riders in the peleton even faster to keep them from also getting away.

The attacking riders become the most immediate threat. This results in the peleton shifting or evolving to racing for "what's left." At this point, the peleton wont catch any break except, occasionally, by accident. But that is very rare.

Psychology

I have also learned a very important thing about rider focus. Different riders have different abilities to focus on a break and, therefore, chase it. This also varies from category to category and from class to class.

In Men's category four and five racing, most riders cannot focus on a break which is more than 15 to 20 seconds up the road even if the break is still in sight. They will also lose their focus on a break as soon as it leaves their sight.

You will find that, if you can get just 20 seconds up the road, they will shift their focus from you back to the peleton and begin racing for what is left. Beginning racers have very poor ability to focus on a break because of their lack of experience.

We used this knowledge to win a lot of races. Don't believe it? Watch this. The loss of focus point for Men's cat 3's and most Women's and Junior packs is at about 30 to 40 seconds. Men's cat 1 and 2 riders tend to lose focus at about 50 seconds and the lower level pro's tend to lose focus at about one minute.

The best pros? They could keep their focus if you were on the backside of the Moon because they have learned not to focus on you but on their pace. They just remember you are out there and don't stop working until you aren't out there any more.

If you put all of this together, then you can see how the pros manage to win with big solo efforts. Learn it and use it. Remember all of this for when we get to the team tactics. You will see how the pros use all of this to develop their team tactics. But smart riders who are racing locally or without a team also use this knowledge to increase their chances of winning.

Evolving The Peleton

A strong, experienced racer will use tactics to cause the peleton to evolve so they can break away. A smart, strong rider will use tactically placed attacks to fatigue his competition so that they will be less willing to chase when he decides to go up the road. Team racing does this even more so.

When I was racing and realized that I had tired my competitors so they didn't want to chase, I had a "not so friendly" little tactic I liked to use before I would drop them to go for a solo. I was not satisfied with just destroying the body. I knew that if I also destroyed their minds before I dropped them, they wouldn't want to chase later after they had slowed and rested for a while.

I would stick around, torture or play with them for a while so they would know there was more where that came from, make them want me to not be around any more, and then dump them and ride away. This kept them from coming back later in the race and catching me when my legs may have blown. It greatly increased my success rate for solos.

In a bike race, I wasn't too nice of a person and was even known to be psychologically mean or even cruel. I justified it by saying they weren't exactly trying to be nice to me either. Importantly, I would never injure another racer physically to win a race, but psychologically or tactically I was ruthless.

Team Racing

It is very important to understand that team tactics don't guarantee winning but they do greatly increase your chances and consistency at winning. Good pro teams can make it almost impossible for an individual rider to win a single day race and impossible to win a stage race.

We must start with defining offensive and defensive tactics. You must remember that there are usually from ten to over 20 teams in one race. Because of this, two or more teams can be on the offensive at the same time or "share the offensive."

Basically, an offensive tactic is where a team uses a tactic to take control of the peleton and make as many of the other teams as possible to do what the offensive team wants them to do. They make you ride their race.

A defensive tactic is where a team uses a tactic to neutralize the offensive efforts of one or more other teams.

A very common offensive tactic used by pros is what I call the **controlling break**. Normally, two or more teams will send strong domestic riders up the road early in the race. This places the other teams between a rock and a hard spot. If they don't chase the break, it stays off and wins the race. If they do chase the break, the riders on the offensive teams sit on the wheels of the defensive teams and rest while the defensive riders work. Teams use this technique to pre-evolve a peleton and set their top riders up for the winning break.

A good pro team will use this tactic to strip the domestiques from around the team leader they are protecting and force the team leader to work, decreasing his chances of winning. The more riders your team eliminates, the better your team's chances of winning.

Learn to think of domestiques as the offensive and defensive linemen of bicycle racing. Only, they have to play both offense and defense without substitutes, time outs, or huddles.

A team will often shift back and forth from being on the defensive to the offensive as breaks are caught and new ones go up the road. This is one

reason why it is very helpful to think of offensive and defensive tactics so you can quickly adjust.

It is a very important rule to never chase your own teammate. **Never do your competition's work for them.** If they want your teammate, they have to do the work to catch him.

This requires that you be willing to let your teammate win and you think team. If you chase your teammate, the other teams will learn to use this against you. We used to do this very effectively against teams that we knew would chase their own teammates. If you'll do my work for me, I'll let you. If I know that you can't let your team mate go up the road, I'll wait until you break and let you chase him down for me. Then I'll dump your tired legs and win the bike race with my fresh legs. Thank you.

Examples

As in all other sports, different coaches prefer different strategies in bicycle racing. We have coaches who prefer defensive strategies, offensive strategies, and a blend of both. Three really great examples from the 80's and 90's are Eddy B, Lynn Pettyjon, and Kent Bostic.

Kent is probably the most successful coach in the US who preferred defensive strategies. His preference was to gain a lead in a stage race and then use his riders to protect that lead. For a single stage race, Kent used his team to keep breaks from getting away until he was ready to go.

Eddy B is definitely the best ever US based, purely offensively oriented cycling coach. Eddy was a genius at pre-evolving the peleton. In single stage events, he used a two-squad system that dominated races for years. Eddy would split a team of ten riders in about half. The first squad would go to the front to evolve the peleton while the other squad rested back in the peleton.

The way the first squad would work was fantastic to watch. They would do what I call relay attacking. One rider would break away to make the other teams chase and, just before he was caught, another teammate would head up the road. This way, they would keep the other teams chasing and not let them rest. The race would be brutal and legs broke quickly.

Mean while, the other riders in that squad positioned near the front to cover any attempts to bridge to the break. If anyone tried to bridge, one of Eddy's riders would jump on his wheel and refuse to help chase his own teammate. The bridging rider either had to sit up and go back to the peleton or tow a rider up to his team mate knowing they would promptly work him over with relay attacking.

This kind of racing requires a lot of discipline and fitness.

As soon as the first squad's legs began to tire and a few riders would fall off task, the second squad would step in and finish off already tired legs. When enough legs broke so that the peleton would hesitate to chase, Eddy would send his best up the road. I loved to watch him work.

Lyn had a slightly different strategy for a single stage race because he used a more horizontal structure for his teams (see Team Structuring.) Lyn's riders would all assault the front of the peleton with rapid and powerful relay attacking from the start. If, at any time during the race, even with the first break, a rider got into a break that began to gain ground and his rider had a good or better chance of winning the race, everyone on the team domesticated to support that break. The only exceptions to this were his first year riders who rode as pro-apprentices for a year or more to earn their "wings."

Because of Lyn's team structure and his racing strategy, we all had to cover every one of Lyn's riders who sneezed. He regularly hammered packs to putty. I believe that Lynn was the best US coach at mixing offensive and

defensive strategies. Because of this, he was an excellent coach at stage racing.

In 1994, while I was getting my MBA at the University of New Mexico, Desi Brown contacted me and asked if I could help him. The UNM team had just taken a brutal beating by the Arizona college teams and his riders refused to accept cycling as a team sport.

He asked if I would just give a lecture to the team on team tactics. I gave them a 45-minute lecture covering some of this page and some of the tactics page. I basically taught them to use Lyn's team structure and tactics because I didn't know any of the riders and couldn't effectively structure it any other way.

They practiced what I taught them for two weeks on training rides and rode their next race against the other New Mexico and Arizona college teams.

They took **NINE** of the first **TEN** placings (NMSU got ninth.)

There wasn't an Arizona rider in the top ten. It was so brutal that I **almost** felt sorry for the Arizona teams. They spanked them and sent them home crying.

I gave them a few more lectures and worked with them at a few races that spring. For the next few years, UNM dominated the New Mexico/Arizona college circuit and won a number of college and USCF national titles. When you finish reading this book, you'll know more than I taught them. Have fun.

I believe that there is one acceptable exception to not chasing your teammate and I will cover this under Purse Strategy.

The Break

It is important to know that, if riders from at least two or more of the top five teams in the race are not present in a break, it will almost certainly come back. This is because there will be too many strong teams working against it and not enough strong teams working for it.

If a strong team doesn't like the make up of a break, they will work against it even when they have one or more riders in it. If there are two of the top five teams represented in a break and one of them doesn't like the make up of the break that is at least as bad and possibly worse than only having a rider from one of the top five strong teams in the break. Especially if that one rider is a "marked" rider that the other teams will not let off in a break.

Learn to read the team and rider presence in a break to determine the probability of the break staying.

Once a break is established and the riders are all working together smoothly in the break, **better than 90% of the action, which will determine the success of the break, will take place in the front of the peleton.**

That is where the really great team battles take place in a race. If a defensive rider is on the front chasing the break and the first rider behind him is an offensive rider with a team mate in the break, as soon as the defensive rider swings out for the next rider to pull through, the offensive rider will slow the pace giving time back to the break. Will another defensive rider come around him to re-establish the pace before the peleton loses time?

Watch the first ten riders on the front of the peleton to see whether the offensive or defensive teams are controlling the race. This will determine whether the break stays or comes back.

Energy Efficiency

An important part of race strategy is that you understand the roll of energy efficiency. In any race, you will only have a certain amount of energy you can expend depending on your fitness level, how overtrained you are, and other factors. You need to set your race strategy so that you will expend the energy where it will do the most good. This is particularly important for stage racing.

The question is, "Where can I gain the most time for the same amount of energy expenditure?" The obvious answers are climbing and time trialing.

You can ride yourself stupid and only gain a few seconds on the flats because more riders can stay in the pack and contribute to the chase effort. On long climbs, more riders are eliminated from the peleton and the chase. In time trials, you are one-on-one without the benefit of teammates.

In a stage race, you want to put your best efforts in the hills and in time trials. In a single stage race, you want to plan your breaks in relation to topography, which I cover under race format.

Paying Rent

Some times, in a stage or series race where things are not going very well and you are not in the hunt for the win or when going into a single stage race you know you can't win, you have to do what is called "paying rent."

You send one of your best riders up the road on a really long solo from the start of the stage knowing he will be caught. Your instructions will be to get as much ground as you can and stay off as long as you can. It is a suicide ride. The reason for this is simple business. The media will not be able to tell whether he can win the stage and will be intrigued by his superhuman effort.

He will "get press" for himself and the sponsors. All coaches do this at one time or another to appease their sponsors; especially at the end of the season and if the sponsors are borderline about sponsoring again next year. Such is life.

As a coach, you are always trying to figure out why the other coach is doing what he is doing. I have spent hours talking with Lyn, Eddy B, Warren Gibson, and other coaches analyzing the tactics and guessing the intent of other coaches.

Coaching is playing chess against every other coach who is there that day. I call it bike chess. Forget this one-on-one stuff. In cycling, you can be second guessing 10 to 20 coaches at one time. Fortunately, only a few are the most significant.

Don't Go To A Race To Lose

When I was racing, I could usually tell what my potential performance was based on my fitness level in relation to my competition. Because of this, I rode a number of races to place.

In almost every race that I did this, I was confronted with and missed a winning opportunity. Therefore, I developed a racing strategy that, if I have a sufficient fitness level to have even a remote chance of winning, to never go to a race to lose. That way you will be ready to jump on that winning opportunity when it lands in your lap.

The only time you should race to place or for a secondary title is when you absolutely know that either you or your team cannot physically support any kind of winning action. Then, you race to place.

It is important to understand that you will often have to set your race strategy based on who is at the race. This is because of relative strengths

and weaknesses. You always want to try to force your competition to confront your strengths with their weaknesses while keeping their strengths away from your weaknesses.

Sometimes, racing to win may mean that you ride your brains out and get dropped for a few weeks or even months to get stronger and faster so you will win more races later on.

Pros often hammer themselves out of one race to win even more races down the road. Racing aggressively is your best training. Your temporary race strategy can be for a long-term fitness development.

I used it a lot with my developing riders. It works.



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Part II • Chapter Two

Racing Tactics

Racing Tactics

The best defense is not a good offense. The best defense is to have the BEST offense.

What is a tactic? A tactic is basically any singular movement in support of a particular strategy. In other words, a strategy is your overall game plan and the tactics are the many little movements it takes during the game to achieve the goals of your strategy. The common basic tactics in cycling involve attacking, blocking, chasing, and bridging.

Tactical Movements

Attacking

Attacking, most commonly is an explosive effort off of the front of the peleton. It normally requires a significant amount of acceleration and speed to clear the front of the peleton. This is because of the principles of drafting.

But this is not always true. If the conditions are right, sometimes, it is easier to get away with a very subtle, sit-down attack where you gently roll off from one side of the peleton.

This type of attack can work very well when there is a lot of cat-and-mouse activity focused away from you or late in a race when everyone is tired but will still react to a more explosive attack. The reason this attack will work is because everyone either believes that you really are just accelerating and they are not sure whether you are attacking until it is too late.

It works fine any time the riders will wait for someone else to cover your move. You just very quietly ease off the front of the peleton. Like any other attack, sometimes it works, sometimes it doesn't.

In climbing, there are four basic types of attacks. You have the stand-up attack, a sit down attack where you pull yourself forward into your pedals, a sit down attack where you push back against the rear of your saddle with your hands on the tops of the bars, and the roll-off attack which works even better when climbing.

You need to practice all of these to develop the fitness necessary to properly execute them in a race. Remember that your body can only do what you train it to do.

We also have combination attacks. These are attacks, which are combined with the movements of another rider such as release attacks, lead-out attacks, and diversionary attacks. I cover release attacks in my chapter about blocking because they are designed so that your teammate is already in position to block for you when the attack and release are made.

The lead-out attack is when two riders work to get one off using a lead-out for the acceleration of the attacking rider. It starts further back in the peleton where riders are less tempted to jump on your wheel and go with you. The lead-out rider tows the attacking rider to the front of the peleton and, upon reaching the front; he swings out TOWARD the peleton opening the "door" for the attacking rider and positioning himself to block.

This way, both riders reach the front at full speed, the attacker is fresher to help him open ground as quickly as possible, and he has a team mate at the front to "get in the way" or briefly confuse everyone.

Occasionally, a team will be sophisticated enough to couple the lead-out attack with the release attack to make sure that no one gets on their

attacking rider's wheel. Of course, when the releasing rider (break man) releases, you have two riders getting in the way.

The diversionary attack is a coordinated team attack where one rider will "attack" on one side of the road just hard enough to draw the peleton and their eyes toward him while a teammate, who "accidentally" got left on the other side of the road by himself, slips away.

Blocking

I have given a full chapter to blocking because of the misunderstanding that presently exists about it. To learn more about blocking, see my chapter; Blocking.

Chasing

Chasing can be an individual or group effort. It can also be done to bring the peleton back up to a break or to bridge to a break leaving the peleton behind. Unfortunately, it can also mean regaining the peleton after falling behind for some reason.

A group effort does not always mean team. It could be two or more riders from different teams with the same goal, each hoping HE will be the one to achieve that goal. We call that winning.

A team chase can be both individual and group. In pro racing, often one rider will be instructed to do a suicide chase effort to bring a break back into the peleton. This individual effort may last for miles and requires considerable discipline and fitness. With this kind of effort, you have to be able to focus internally. You also have to understand that, in pro racing, you are doing a job and you just have to get the job done.

A team group effort is very organized and difficult to stop. Most people don't believe it can be stopped. (See my chapter on Blocking.) The riders organize

a paceline with a gatekeeper at the back to keep out any riders who will disrupt the chase effort.

The gatekeeper may be your team leader who is acting as gatekeeper and being protected at the same time or your riders may take turns being gatekeeper for a little extra rest. If you have ever ridden behind one of these, you can understand why they call it a train.

Bridging

As stated before, bridging is a form of chasing but it is also a deliberate move to change from a defensive position to an offensive position. Of course, there is also the bridge done by an offensive team to strengthen their position by adding another teammate to the break. This is how UNM took nine of the first ten spots in their first comeback race. It can be used to pick up additional placings. See my chapter on Multiple Placings. It works.

Almost all cycling tactics are developed using these movements.

Fitness and Tactics

One of my jobs as coach of a farm program was to teach different tactics for the different fitness and skill levels. I had different weekly lectures for the different skill levels of the riders. I promoted the riders based on what I knew they were ready to learn.

Some riders thought that being in a group for a long enough period of time meant they should be moved up. When they became offended and insisted I move them up to the advanced class, they found that there wasn't much there they could use in their racing because of their fitness level.

As riders develop physically and mentally, they are capable of using more advanced tactics. A cat 3 cannot do most of the long, drawn-out tactics the pros use because they don't have the fitness level needed to sustain the

same kind of effort for as long. Learn from the pros but modify your tactics to your fitness and experience levels. You cat 3's don't have the fitness level to sustain a three to five mile sprint train like the pro's. Do a shorter sprint train.

Attack Systems

What I call an attack system is a series of movements used from the start of an attack until it either succeeds by winning or fails by being brought back to the peleton.

Most lower category attacks fail because they use an incomplete, two-phase attack system instead of the three-phase attack system that pros use.

The two-phase attack system involves two movements. First, the rider attacks and, after getting a little ways off the front of the peleton, he shuts down to pace against the peleton. The two-phase system almost never succeeds. It is common sense that your legs are going to get tired before riders who are taking turns. They're going to bring you back in.

The three-phase attack system involves the attack, the pursuit, and then the pacing against the peleton.

As soon as a rider or group of riders are clear of the peleton, they should go into an intense pursuit mode to open as much ground as possible as quickly as possible. This extra distance between the peleton and break is what I call working daylight. It provides your team the opportunity to work into any chase effort and begin disrupting it for you.

You have to have enough distance between your break and the peleton so that one strong rider cannot go to the front and do one short hard effort to bring you back in which makes it possible for the second rider to come through to be one of your team mates. A sufficient distance also causes the

peleton to evolve from a pursuit effort to a pace effort themselves. They know it will take longer to catch you and settle down to a slower chase pace sooner. The minimum distance for this to take effect is 15 to 20 seconds. You shouldn't even think of slowing from your pursuit effort until you have at least that much distance.

The working daylight is very important. It is the time between the break and the peleton from which seconds will be taken by a chase effort. You need enough time so that even two or three hard pulls will not endanger the break.

It acts as a time cushion permitting you the racing comfort of knowing it will absorb the time fluctuations caused by the see-saw battle of chasing and blocking I discuss in my chapter about blocking. The more cushion you have, the greater the time fluctuations it can absorb. This permits your teammates in the peleton to have more opportunity to neutralize the other teams' chase efforts.

Of course, the greater the distance you can open before you drop out of the pursuit phase to the pace phase, the longer it will take the peleton to catch you after your legs tire.

You are creating a fatigue buffer zone for yourself while your legs are still fresh.

A great example of this was in an interview with Thurlow Rodgers after a trip to Europe. Bernard Hinault attacked in a single stage race and Thurlow and six other riders went with him. After his initial attack, Bernard swung out, looked back to make sure they were clear of the peleton and to see who was with him, swung back onto the front of the break, put his head down, went into pursuit mode, and didn't back off until they had a lead of over one minute. They stayed off for the race.

Timing

I love watching two or more cat 2's and 3's talking in bike shops. They always work their way around to the topic of when is the best time to attack in a bike race. They approach the topic from a very simplistic perspective and each has his one place where he really likes to attack.

So, where is the best place to attack in a bike race?

Changes

Any time you have a change in anything during the race is a good time to attack.

When the topography changes as you go from the flats to a climb, as the grade eases at the top of a climb, and any kind of little roll in the course is a great place to attack. When the course changes directions at corners and curves are great places. When the attitude of the pack itself changes, especially if no one expects an attack, such as on down hills or when the pack slows to rest.

When the weather changes such as rain, wind, and hail. Any time that one or more riders are being caught is also a great time to attack. If you are in the break and it laps the field is an excellent time to attack. These and many others are all great places to attack but we have to consider other factors.

Race Strategy

The most important factor for determining where to attack is based on race strategy. If you are riding defensively, you may want one hard attack at a specific point in the course.

Eddy B's and Lyn's riders attacked constantly until everyone was dead meat and then did one last attack on the peleton to establish the winning break only to resume attacking as soon as they felt the break could not be caught.

With a controlling break, you want one good attack early in the race to establish the break and then prevent any further attacks that may endanger your tactical position in the race. Then, after the defensive teams have tired themselves out chasing the controlling break down, you want another big attack to establish the winning break. The timing for that break is usually just before or after the controlling break is caught. Until you catch it, you won't know where that will be so you have to be ready to go anywhere or anytime.

Factors

In developing tactics, it is first important to understand the basic factors, which cause the human body to fatigue. The best known because of current marketing is wind resistance.

This factor has sold who knows how many millions of dollars in aerodynamic equipment. But it goes beyond that. Your riding habits affect the amount of energy wasted to wind resistance more than the equipment you use. I cover this topic under Riding Discipline.

Sprint Cover

A very common occurrence at the end of races, particularly in Criterium, is that the peloton will shut down to play cat-and-mouse for the final sprint. You do not want this to happen because it permits tired riders to rest and means that more riders from other teams will now be contenders for the sprint.

The ideal is to keep all of the riders on the other teams chasing and continuing to tire them. The harder they ride during those last few laps, the less chance they will have of winning the race.

What your team should do is develop the discipline to keep the other teams chasing right up to the start of the sprint. The tactic used for this is very simple.

Any time the pack slows to jockey and rest for the sprint, one of your riders other than the sprinter should jump up the road, even if this has to be the lead-out rider. Your lead-out should only do this if he is the only rider on your team still there other than the sprinter and it is too early to start the lead-out.

This move puts your competition between a rock and a hard spot. If they don't chase, they find themselves racing for second. If they do chase, your sprinter and, maybe even your lead-out, sit on their wheels resting for the sprint.

Always control the race right down to the sprint itself. I have seen too many teams control the race brilliantly until the last few laps, lose control by letting the pack shut down for the sprint, and lose the race.

Don't give up control when you have it almost won. The race isn't over until your rider crosses the finish line in first.



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Part II • Chapter Three

Team Leverage

Team Leverage

In competition, you should always play your competition against your teammates. I call this team leverage.

A really great example of this is how Alexi Greywal won the 1984 Men's Olympic Road Race. It was a classic use of team leverage.

There were only five riders per team and the US got four of them in the winning break along with two Europeans and Steve Bauer. Eddy B (the national head coach) sent one of our riders back to provide blocking and cover for the break. That left Alexi, Davis Phenny, and one other US rider. Eddy expected the race to come down to a dual between the two sprinters Davis and Steve.

Alexi jumped up the road on a control break forcing Steve and the two Europeans to chase while Davis and the other US rider sat in but Davis was having a bad day. With a few laps remaining, Steve attacked and broke from the main break. The chase effort of the two Europeans dropped Davis and Eddy sent the other US rider back to tow Davis back into the race (a call I disagree with.)

I don't send good riders back for blown riders. I adjust my strategy and keep going.)

Alexi had blown and was struggling up the biggest climb on the course when Steve caught him. Being a great rider, Alexi sucked it up, jumped on Steve's wheel, and struggled to stay with Steve while he recovered.

The two European riders were far enough back that they couldn't tell who they were. Steve didn't know that his attack had broken Davis and that Eddy had sent the other US rider back. Alexi didn't know who the two riders were either but he did know that Steve also didn't know who they were. So Alexi pretended that he knew that at least one of them was a US rider and used his actions to convince Steve that it was true.

Alexi stayed on Steve's wheel refusing to do any work "against his teammates" and kept waving for the two chasing European riders to catch up as if he knew they were his US teammates. Steve didn't want to sprint against Davis with a teammate to help Davis.

So he stayed on the front and towed Alexi for the rest of the race. Alexi even forced Steve to lead out the sprint and, with Steve having done all of the work for so many miles, had taken enough out of Steve's legs while resting his own legs that Alexi was able to beat Steve in the sprint for first place.

What Alexi did was to use team leverage to force Steve to ride the way Alexi wanted him to ride. He did this by leveraging Steve against the two European riders because he had convinced Steve that they were his teammates. It was brilliant.

In properly developed bicycle road racing, it is understood that a rider will not work against his teammates. This is very important for a number of reasons. Remember that I taught you that a break would probably not stay off if there were not riders in the break from at least two or more strong teams.

When a rider gets in a break with one or more riders from other strong teams, he is not just depending on his own teammates to keep the peleton from catching the break. Each rider in the break is depending on his own teammates **AND** the teammates of all the strong teams represented in the break by a rider to keep the break off.

Therefore, pros become concerned when they see a rider from a strong team who rides against his own teammates. Riders in a break can't depend on riders from that team to help keep a break off even if that team has a rider in the break.

This is such a concern to the pros that, if a rider from a top team works against his teammates, they will tell that riders' coach. (I gave you an example of this happening to me when I tell you about my tactic of boxing the train.)

You see, your teammates not working against you and working for you when you are in a break is part of what earns you a right to be in a break. The rest of what earns you a right to stay in a break is your contribution to the success of the break.

This professional team discipline is what gives a rider team leverage against his competition. If the other teams know that the riders on your team won't chase each other, then they have to respect that strategically. It is this professional discipline and respect that writes the rules for team racing.

An example is if a team gets two or more riders in a break, then it is understood that one of those riders will sit on the back of the break while their teammate(s) do their work for them. This permits one rider from that team to rest for a final attack or the sprint finish. The other riders in the

break won't like it, will protest it, and use tactics to beat it but, if the shoe is on the other foot, they will all do the same thing. That is bike racing.

It is also understood that riders in any group of two or more riders will not work against their team leader. They will disrupt a break, sit on the back of the break, or drop back to help their team leader chase the break.

If a rider is in a break and finds out that he has a teammate bridging, he will stop working until his teammate catches the break. This is done to increase that rider's chances in the race. Remember that team tactics are superior to individual tactics. If a pro has a choice between using individual tactics or team tactics, he will choose the team tactics. This is the strategy Alexi used to beat Steve even though neither of the two chasing riders were actually his team mates. They didn't have to be Alexi's team mates as long as Steve thought they were Alexi's teammates. See how important psychology is?

If the other teams know that you are not professional enough to work for your teammates and will work against them, you not only lose your team leverage, but they will actually use your own teammates as leverage against you. They will let your teammates go up the road and wait for you to start chasing them.

I taught my riders to do this. One of my racers had just taken a pull in a race and swung out when a rider from a team where the riders were notorious for chasing their teammates attacked off the front. The next rider through was from the same team so my rider looked at him and said, "Your team mate is getting away. You better get him." And he did.

We laughed about that one for years. That team became a club joke for my team and every other team, which had been taught right.

Once you lose your team leverage, it can take a half a dozen to a dozen races of your riders letting their teammates go up the road and win to regain that respect and team leverage.

Having teammates work against each other will also mean that the top teams will not want any of the riders from your team in a break. They can't depend on your team to do what is right.



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Part II • Chapter Four

Team Structure

Team Structure

How you structure your team is very important because it will have a lot to do with the success of the team for the year.

Team structures range from a vertical structure where the team has a definite team leader and pecking order to a more horizontal structure where the team will race for whomever is having the best day and opportunity to win. You can have any variety of structures in between.

Kent Bostic preferred a vertical structure to his team with himself as the team leader while Lynn Pettyjon preferred a horizontal structure. Eddy B fell somewhere in between.

There are pro's and cons to both structures and how you structure your team is most often determined by who is on your team. Usually, only teams with a very good recruiting program managed by the coach can design a team around the structure they want.

An important factor to consider in structuring your team is your racing calendar. A team that is going to ride nothing but relatively flat criteriums shouldn't structure a team around climbers or GC riders. You also consider your budget. Can you afford to hire the riders needed for a certain type of structure? How much can you travel? What is your coaching style? Eddy B did best at single stage events and Pettyjon did best at stage racing.

The advantage of a vertically structured team is that you have more depth in your domestic support for your strongest rider (s). The horizontal team

structure makes it so that other teams can't just concentrate on one or two of your racers. They have to beat the whole team, which makes it easier for one of them to sneak away and win the race. You can't put a rider on the wheel of every rider on another team and still race to win.

Let's say you have a budget for 10 riders and a small staff. Your calendar is a good blend of road races, Criteriums, stage racing, and time trials. A standard structure you might want to use as a guide would be as follows:

- ↪ One Sprinter
- ↪ One Lead-out Rider
- ↪ One to two GC Riders (good climbers and time trialists)
- ↪ Two to three strong Criterium riders
- ↪ Two to three Domestics/climbers/stage racers
- ↪ Two to four Domestics/general roadies

Exactly how you will structure this team depends on how many stage races, Criteriums, and other races you will do and which riders you can get.

Your lead-out rider should be able to double as a sprinter and the Criterium riders can double as both lead-out riders and sprinters. You will need climbers who are good stage racers to provide your GC riders with team tactics in the mountains and stage races. A lot of teams forget this and will often find they only have one rider in the first pack on long climbs.

Team tactics are always superior to individual tactics. The general roadies give your team extra muscle in both the Criteriums and stage races and can be strong potential winners in flatter road races. This would be a well-balanced general road team. But you may not want this particular balance.

Your team structure determines which tactics you can and cannot use. Who is going to chase a domestic from a team, which only races for one rider?

With a horizontally structured team, you cannot systematically sacrifice one rider after another to get one rider on top of the podium. You choose. Do you prefer offense or Defense? Vertically structured teams tend to use more defensive tactics and horizontally structured teams tend to use more offensive tactics.

You will find that you may also change your team structure with different types of events.

Single stage events may cause you to go horizontal and offensive. Medium to long stage races may cause you to go vertical and defensive. The Tour de France requires a more vertical structure to win with a blend of offensive and defensive tactics depending on stage format.

Flexibility and versatility are also good weapons. Ask Lynn, he was a master at them.



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Part II • Chapter Five

Purse Strategy

Purse Strategy

Purse strategy sounds like a funny topic, doesn't it?

But there really is strategy to determining how the purse is split and the debate over purse split has killed some promising teams. Therefore, you really need to think this one through.

You never want your riders to be thinking about the purse split during the race. This means the matter should be settled in everyone's mind before the race begins. I have seen more teams held back because the riders would be thinking during the race, "I will make more money if I win than if he wins."

Without one exception, this has always lead to teammates racing against each other and you know how much I love for you to do my work for me. Thank you.

This is why the simplistic and primitive idea of each rider taking his own winnings just does not work. The income of every rider on the team from purse money should be the same regardless of who wins. This is the only way that you can be sure your riders will be thinking about the team winning instead of racing against each other to pay rent.

The European teams handle this nicely. All winnings go into one pot with everyone taking an even split and the staff sharing one split. This is

regardless of who races where or wins what. You cannot let greed destroy your team.

We have a nasty little purse split here in the US called the 50/50 split that I hope my competition will keep using. With this split, each racer keeps 50% of the money for his win or placing, puts the other 50% in the team pot, and takes a split from the pot. This split method says that the domestic who sacrifices a chance to place to help a team mate win or place is not worth much. If you win or place, you make more money than if you sacrifice for the team.

The teams that use this system insist that it does not affect their teams racing. I used to discuss this with riders and teams but their greed kept them in denial about the truth so I just shut up and took advantage of their greed to beat them. I would stand on the sidelines and watch their riders chase each other because the rider who won made the most money.

You have to understand that we do not properly appreciate domestics in cycling. They get far less in contract money than the team leaders but often work much harder to help the team leader win. The domestics need the purse money more than the team leaders because they are paid less in contract money and will definitely give in to the temptation to chase a break with a team mate in it, because they will make more money if they win than if the team mate wins.

You have to understand that when you are sharing your purse with your teammates, you are paying them for two things. First, you are paying them to not chase you. This effectively eliminates one pair of legs from the chase effort and increases your chances of winning. Second, you are paying them to interfere with the efforts of other riders which eliminates even more pairs of legs from chasing you and further increases your chances of winning.

If you get greedy and don't pay your domestics for the work you want them to do, why should they do the work? You can bet they won't. They will not interfere with the effort of others and will chase.

I actually tell riders that if their team leaders get greedy and refuse to pay them for their work, don't do the work. I, personally, would be the first rider by them with the pack on my wheel to let my team leader know exactly what happens when he does not pay me for my work. You get what you pay for. My attitude towards greedy team leaders who don't want to pay me for the work I do is, "If you screw me, I screw back and I screw better!" Let him find out how much less he will win if you don't work for him. Every pedal stroke you do on the front is one less pedal stroke he has to do on the front.

If I were an aspiring racer who wanted to improve my racing and I had enough to live on from my contract money, I would take this a step further. I would invest in my future.

I would make it known to everyone on the team that, if you work for me and I win, I won't take a split. I would want my teammates to know that they will make more money if I win than if anyone else on the team wins. Now, whom do you think they will want to work for, you, themselves, or someone else? Think about it. Invest in your future by paying your teammates for the work they do. Greed will kill your future.

But, Coach, how does that apply to the lower categories where all we win is junk or goodies and no cash?

The best method of handling the purse split at this level is to have everyone put their useful loot into a "team closet", sell the rest, and either split the

money or save it for team expenses. From the closet the riders on the team get tubes, bottles, or whatever, as they need it.

You do have to be careful to monitor this system because some people will try to take advantage of it.

Loyalty from your team riders starts with loyalty to your team riders.



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Part II • Chapter Six

Blocking

Blocking

The term "Blocking" was used by cycling in the mid 1800's long before sports like football and ice hockey were very popular in the US. Sports such as football and ice hockey use the term "blocking" very differently than what was first meant by blocking in cycling.

Unfortunately, the bike boom of the early 70's brought a lot of people into the sport who were more used to the more physical meaning of blocking from football and ice hockey. Therefore, they tend to think of blocking as meaning slamming, pushing, and bumping.

In cycling, blocking refers to a subtler and finessing action. A proper definition for blocking in cycling would be to impede or gently **SLOW** the progress of another.

In cycling, a winning break of only 30 to 40 seconds ahead of the peleton is considered a good size gap. If you are racing at an average speed of only 25 miles per hour, you are covering one mile every 2 minutes 24 seconds or 144 seconds. If you slow the peleton an average of one tenth of one mile per hour below the average speed of the break, the break will gain 14.4 seconds per hour. A difference of only two tenths of one mile per hour give you a gap of 28.8 seconds or a very good size gap.

It should be obvious that, in blocking, we are not dealing with miles per hour, but tenths of miles per hour.

In fact, the physical slamming type of blocking, when used in cycling, only angers the riders you use it against and their team mates, their adrenaline flows stronger, and they end up riding harder than if you had done nothing. The proper technique in cycling is to lull your competition into accepting the slightly slower pace you want. The trick is to go fast enough that the competition will want to stay on your wheel and but slow enough that the break is gaining ground.

I remember listening to two cat 3's who had tried blocking for the first time and found it to not be successful. They thought they could just go to the front, slam on their breaks (as we call it), and the riders behind them would stay behind them. Of course they won't.

Blocking is not only a finessing action but is also persistence. Blocking is a seesaw battle, a game of adding and subtracting seconds.

You will briefly slow the pack for a few seconds giving the break a one or two second gain, the pack will come around you and take back one or two seconds, then you will give the break a few seconds back, and so on. Often, the last one to quit wins. Sometimes a block involves nothing more than what the pros call rolling through which is just slowing down slightly as you pull through at the front of a paceline.

Active and Passive Blocking

I always teach that there is both active and passive blocking. Active blocking is where you physically interfere with the efforts of others. Passive blocking is simply not helping to chase the break that is off.

You are denying the chase effort the strength of your own legs and decreasing its ability to catch the break. Sometimes, that is enough to keep the break off.

First Ten Riders Rule

To properly understand blocking, you have to understand a very important tactical concept. In order to control the speed of a peleton, you only need to control the speed of the first ten riders in the peleton. The first ten riders control the speed of the peleton because the peleton must travel as fast as the first ten riders.

You see if the first ten riders ride faster than the peleton, then they will ride away from the peleton. If the first ten riders travel slower than the peleton, then the peleton will pass them and establish a new first ten riders. Even when a rider attacks, he becomes one of the first ten when he passes the tenth rider. The point here is that you don't have to worry about controlling the riders from 11th to 100th, just the front of the peleton.

Obviously, the best times to block are places like at the top of a hill, in corners, and at the end of a race when everyone is tired and they don't want to pull through to re-establish the pace.

Normally, pros will try to work into a paceline to slow it when they hit the front. The other pros usually stop this by either using a "gate keeper" at the back of the paceline to keep blocking riders out of a paceline or simply making it clear to the rider that he should not venture into the paceline any more. At this time, most riders just sit in and let the paceline do its damage. A team paceline in pro racing is considered unstoppable.

I never bought that. There are other techniques, which will also disrupt a paceline and slow it down.

One technique that disrupts a paceline is to attack as if you are trying to bridge and join your teammate in the break. The way this works is that the other teams don't want you to join your teammate because two or more teammates in a break are more difficult to catch. When you attack, they

must cover your action and when they catch you, you shut down and all but the most disciplined pro's will shut down at least a little to watch you.

What you are attempting to do is to divert their focus from their chase to you by making yourself the most immediate threat. They will want to deal with you and then, when they feel they have neutralized that threat, resume the chase. I call this a diversionary tactic.

After you have attacked once or twice, you will be able to sit just off to the side or behind the paceline and slow the paceline just a little. Why? They will not be able to continue putting 100% into their chase effort because they have to reserve something to cover your next attack. An occasional attack after that to remind them you are there will help to slow the pace even more.

There are two more reasons why this will slow the chase effort.

First, it is only normal for riders to slow when they catch someone even if there are still riders off the front because they have been chasing and want to rest. Only the most disciplined pros will just chase right by a break after riders who are still off.

Second, when riders have to jump, they will tire faster and begin to slow more with each attack. Caution: Your attacks must be fast enough to barely get off and make them chase you but slow enough not to do any serious damage to the break. Also, if they think you are bluffing and let you go, you must go for the break. Watch them closely and, if they change their minds and chase, soft pedal so they catch you sooner and do less damage to the break.

When they catch you, slow down and they will tend to slow to keep an eye on you. One or two more short attacks will keep them guessing. If you can successfully divert their focus from the break, they will shut down to race

against you and you can develop it into a cat and mouse game, which will slow the pace even more.

In a So Cal Criterium sprint finish, one of my racers attacked and broke away at 400 meters to go and the pack went after him. Another one of my riders used a diversionary tactic to keep him off for the win. What he did was to "attack" on the other side of the course like he was trying to bridge to and help his teammate. Suddenly, the pack was in a catch 22 situation.

First place was up the road and they didn't want to find themselves racing for third. The entire pack swung across the road to neutralize the most immediate threat. He diverted their focus from his teammate off the front to himself and forced them to race for second instead of first. Plus, by making them ride across the road to neutralize his threat, he made them take the longest route to the finish line. It works.

If two teammates coordinate such an effort, they can relay attack a peleton to slow it. One rider attacks one side of the course to draw the pack after him and then a teammate attacks on the opposite side of the pack to draw them back to his side of the road. This is very confusing and threatening and will draw the pack's focus from the chase to the peleton in a hurry. This will shut a pack down really fast because it is very difficult to watch riders on both sides of you at the same time. Team tactics work so well.

I used psychology to block for a rider while coaching a Criterium in So Cal. My rider was on break with about 10 to 15 laps left in the race. He was just far enough ahead of the peleton that an organized and sustained effort could have caught him.

After several laps of watching the time fluctuate as his teammates worked hard blocking to keep him off, I decided to use my competitions' minds to beat them. I called up to my riders in the peleton to stop blocking and setup for second because their teammate had first secured. This had the effect I

had expected. One or two riders did a last ditch attack to bridge which brought the pace up for a quarter of a mile and then the pack settled down to race for second.

Within three laps, my rider had gained enough time that the entire pack including his teammates couldn't have caught him. I used psychology to divert their focus from the chase back to the peleton to race for second. We got first and second.

Oh yeah, and that matter about not being able to stop a team paceline or train. I developed a technique I call boxing the train which one of my riders used very effectively.

It was a long road stage in the 1990 Casper Classic and one of my riders got off with two riders from Subaru and another team. When the break exceeded about five minutes at about half way through the race, Coors Lite put a team paceline on the front and started grinding the break in. At the last feed, the break only had a lead of about one minute. But, to our surprise, the break stayed off and won by over three minutes with Coors chasing (moving us into the top five on team GC.)

After the race some Coors riders told me that I needed to talk to one of my riders because he kept attacking the break with his teammate in it. I thanked them for the information and found my rider. He was doing what I had taught him to.

Which was?

He was boxing the train. He would position himself a few riders behind the Coors paceline and let them chase for about three to five miles. Then he would attack just fast enough to pass the paceline but **NOT FAST ENOUGH TO DROP THE PELETON OFF OF HIS WHEEL**. After he had the first three to four riders of the peleton ahead of the Coors paceline, he would slam the

peleton to the right gutter smothering or boxing the Coors paceline with the peleton and then slow down.

No one in the peleton wanted to force the pace (it was late in the race) and the Coors paceline had to slow down when the pack did. It would take the Coors riders several miles to dig out of the peleton, make it back to the front, and put their paceline back into action resuming the chase. During that time when the paceline was out of action, the break gained a lot of ground.

Who said you can't stop a team paceline? It works.



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Part II • Chapter Seven

Race Format

Race Format

Understanding the tactical implications of race format is very important in deciding how to structure your team and select your race strategy for a particular race or season of races. The race format will determine which fitness characteristics will be stressed.

Course Topography

Topography plays a major role in determining the tactics you can and should use in relation to your team's strengths and structure. The topographical characteristics we will consider are flat, hilly, mountainous, and cornering.

Flat

Flat racing stresses and even requires the use of team tactics more than any other form of topography because it is easier for more people to maintain contact with the peleton, rest in the peleton, and do more work throughout the event. Hills, mountains, and corners tire riders more quickly, eliminate more riders, and make it more difficult for more riders to actively participate in the battle.

In the flats, the only tools the racers have to effect the out come of the race are speed, acceleration, recovery, and team tactics which use the other three tools. Therefore, team tactics are absolutely crucial for consistent winning and placing.

The best and most active team battles take place in flat races. The best, most adaptive, and most innovative teams consistently win these events. With proper tactical coaching and practice, developing riders will show positive results in flat events first. It takes longer to develop climbing fitness than flat fitness.

In my farm program, my developing riders would be happy to finish in the top 30 to 40 in a hilly road race or stage race at the same time they were doing battle at the front in flat Criteriums. My "upstart" (quoting Lyn :-)) pro-am team was one of the top ten road and stage race teams in the nation when it was one of the top five or six Criterium teams in the nation.

In 1990, we left the seven day Casper Classic happy to have finished fifth on team GC against about six or eight pro teams, Shaklee, and Redlands teams with one pro and a hand full of amateurs. Two days later we entered Super Week after one day of travel and one day of rest.

The first three events had already been run, Gaziolli took the lead on the first day and had been easily extending his lead by racking up points for three events, and there must have been at least half a dozen pro teams who had also been there for those three events (including 7-Eleven), racking up points. We started with the fourth event way behind in points along with about half a dozen other pro teams.

My little amateurs went to the front, used the tactics I taught them, took control, moved our one pro past all of the pro teams, and bumped the very surprised Gaz out of first place. That night, Gaz called a very furious Lyn Pettyjon (that was when he called us upstart :-)), Lyn pulled pros out of a stage race (they were also upset at us because they had already established placings and money they had to walk away from because of us), and flew those pro's in to help Gaz retake the lead from...7-Eleven?...another pro team?...Nah, my upstart little pro-am team :-).

I always thought it would have been funny (to everyone except Lyn) if I had had the money to fly in more amateurs when Lyn flew in more pros. I don't think Lyn would have ever forgiven me for that. By the way, the Coors and my McNall Sports teams were the only two teams to lead Super Week that year.

Flat racing is the best place to learn and develop complex team tactics. Flat racing requires the use of team tactics, attacking, blocking, and chasing.

Hills and Mountains

Hills and mountains require climbing ability and learning climbing techniques and tactics. Rolling hills require short, fast hill sprints. This means hill speed and acceleration, recovery between hills, and knowing how to carry your momentum over a hill. The attacks tend to be up the hills with pursuit over the tops, down the other side of the hills, and on the flats.

Mountains are a different type of climbing and the most common mistake made by teams for mountain races is to not have enough good "first pack" climbers to be able to do team tactics. Lyn was very good at not making this mistake. He really knew how to build a team. Too many teams only have one good climber who gets to use individual tactics against team tactics. Please remember that this is a team sport even when going vertical.

Hills and mountains quickly eliminate most riders from anything but trying to survive the event. Fitness is foremost in climbing.

Corners

Corners offer their own tactical opportunities. They provide opportunities for attacking, blocking, and releases. Fitness requirements are acceleration, speed, recovery, upper body strength, and motor skills development.

Type of Event

The type of event will determine which tactics your team can and should use. We will look at Criteriums, road races, time trials, hill climbs, series races, and stage races and their various formats and topographical settings.

Criteriums

Criteriums are really great American inventions. They are usually very short as compared to other pack races. This means that the racing can be and is often harder and faster.

There is often constant attacking, counter attacking, releases, chasing, blocking, and sprinting. They are great for learning team tactics, bike handling, and pack sprinting. They go a long ways in building speed.

Fitness requirements are speed, acceleration, recovery, power, and leg speed. You have to think very fast because the action is constant and the race is constantly changing with breaks forming and being absorbed. They are a meeting ground between road and track racing and both groups of riders do well in them. Team racing is a must for a good Criterium team.

Road Races

Road races tend to be longer than Criteriums with a slightly slower and more methodical form of racing. Most road races involve hills and/or mountains. Team tactics tend to be more drawn out and more subtle. The attacks tend to be more topographically oriented. The attacks usually take place when topography changes or on sustained climbs. They also tend to be more like small jumps or subtle accelerations.

Sometimes, attacks are nothing more than maintaining your speed when the others slow down to rest. Paceline is a very important tool in road racing where groups will often spend miles grinding away at each other. Blocking

becomes very subtle and calculated. Most sprints tend to be in small groups and, often, uphill. A good road race is almost a religious experience.

Most people think that endurance is the most important tool for road racing. Nope, it is still speed. California racing is very different between Northern California and Southern California. When my farm program's first set of riders made it to cat 3, I sent them to Northern California for their first road race against real roadies. They were very concerned about the stamina of the Nor Cal roadies since they had all been riding nothing but Criteriums.

I reminded them how you use speed to break legs (see Tactics.) I told them that most roadies tend to be plodders and don't have the top end speed of crit riders. I told them to use their strengths against the other guys' weaknesses and don't give them the chance to use their strengths against your weaknesses.

I told them to go to the front at the start, put the hammer down like you do in a Criterium, most roadies' legs will break and they will go through the back door like an express train, they will have to gear down to spin their legs out while you gain ground, and, by the time they have recovered, you will have gained so much ground that they won't be able to catch you and use their endurance against you.

It worked. They didn't doubt me any more after that. Do your speed work, even roadies.

Time Trials

Time trials are mostly pace, speed, power, technique, and psychology. Some strategy is involved in course topography and weather. Starting in a tailwind means saving something for the return in the head wind.

On flatter courses, it is a matter of speed, power, and pacing, not going too fast at the start. Topography means understanding that you will gain more time on climbs per unit of energy expended than on flats or down hills.

Team time trials require communication, understanding relative fitness levels, technique (see Riding Discipline), and flexibility. They are a really great learning experience.

In 1983, I rode a 33-mile; two man TTT over hilly terrain in New Mexico with a young man who had never ridden a TTT. I spent the race teaching him how to ride a TTT and coaching him. We even had to deal with losing time with a flatted clincher where I had to teach him not to blow himself up trying to make up lost time. Just ride within yourself and do your best ride.

We got fifth ahead of a tandem which had passed us while he was changing his tube. It was fun. There is a lot of technique.

Hill Climbs

Hill climbs are not just climbing fitness but fitness is a requirement. If you are close to others, technique becomes critical.

Knowing how to use the roll of the climb to maintain your momentum is important. Most riders slow down on steeper stretches and shift gears. Better climbers just lean on the pedals or stand up on them to carry their momentum up the grade.

Losing speed on a long climb is tough on legs because it is hard to regain that speed and it kills your legs to struggle at a slower speed. Learn to attack when the grade eases because it is easier on your legs and others will want to slow to rest. Also learn to use varied pedal action to rest your legs without slowing down (see Riding Discipline.)

Long climbs are very mental. Don't focus on how far it is to the top. Pull inside of yourself and focus on your pace, gearing, using your body to maintain cadence, and racing. Learn to race inside of yourself and the top will get to you sooner.

The most common mistake people make in long climbs is how they train. It is only natural to try to pace your way to the top of climbs so you don't blow before the top. Attack short, steep climbs to build your climbing speed for the longer climbs. Also learn to attack the steeper grades on the longer climbs for speed work, acceleration, and recovery.

Don't worry about blowing your legs on a long climb. You can always turn your bike around, point it down hill while riding your brakes, and spin backwards to spin your legs out. Then turn around and start climbing again.

Learn that you can trash your legs, recover, and keep going. This is one of the most important lessons you will ever learn in cycling.

To show how mental climbing is I rode a two stage Sandia Crest Race in 1976 after retiring from serious racing in the spring of 1971 and spending four years in the military. The last year I was in the Air Force, I had injured my back and spent most of that year in and out of hospitals. When I left the service in March, I was in terrible shape. I moved back to Albuquerque and started riding again. After three weeks, I rode a 30-mile training ride up Sandia Crest with Steve Woods and others where they had to use a calendar to time my ride.

A few months later, I entered the Sandia Crest Stage Race, which was officiated by Steve Woods. It had a 25-mile circuit race on Saturday and a 45-mile road race that finished with a 13-mile climb up Sandia Mountain. I knew I was in bad enough shape that I had to save everything I could for that last climb. My goal before the race was to finish in the top five.

In the circuit race, the top riders hit the front and broke away. Their pace was too hot for my legs if I wanted to do well on the climb, so I let them go, put together a paceline on the front of the peleton, and went into damage control to minimize my time loses while minimizing my energy consumption.

On the last lap, I hit a rock in the first corner and almost crashed into some spectators standing on the backside of the corner. I finished 45 seconds behind the peleton and 3 minutes 20 seconds behind the first six riders. I think I was about third to last. ☹

The next day started in Madrid, New Mexico with a ten-mile climb and rolling mountains up to San Antonito, which is 14 miles from the top of Sandia Crest. The top riders started at it again on the ten-mile climb out of Madrid and I let them go, put together a paceline and went into damage control again.

About 3 to 4 miles before San Antonito, the leaders had 2 minutes 45 seconds on us. We started a climb, the pack slowed, and I did a reflex attack without thinking that took more out of my legs than I wanted. I slowed to spin my legs out for the final climb and let the pack go.

At San Antonito, a rider who had been dropped by the peleton had over 3 minutes on me. A mile later, I hit the climb, pulled into myself, and started climbing. I ignored everything around me and focused on my pace, the roll of the climb, and carrying my momentum up the mountain. I ignored the riders I passed and focused completely on **MY** ride.

I reached the top 10 seconds behind the fourth rider to the top and put enough time on everyone else that I moved up to fifth on GC. Learn to climb inside yourself.

Series Races

Series races are very different from stage races because points determine the winner. You get the same number of points for winning by an inch as you do for winning by a mile. A lot of close wins will beat one spectacular win.

In most series races, you can ride any or all of the events. In a series race like Super Week, don't kill yourself by trying to ride all of the events. Pick the ones you are most likely to win and build the rest of your schedule around the events you want to win. Be as rested as possible for those events while trying to consistently place in the rest of the events you ride. Long solo's are stupid, go on break with others. Choose your breaks wisely and use good team tactics.

One good strategy is to split your team into two squads. One squad will ride for your team leader to win and place. The other squad will focus on the events your leader doesn't ride with their goal being to minimize the number of points your top competitors pick up in those events. One squad uses an offensive strategy and the other uses a defensive strategy.

Stage Races

A stage race is a two or more day race composed of road races, Criteriums, time trials, and hill climbs. The winner of a stage race is determined by cumulative time. The rider with the least cumulative or fastest time wins the event. This title is referred to as general classification or GC.

There can also be any number of subtitles. The most common subtitles are Points Winner, King of the Mountain (KOM), Stage Winner, and Team GC. To compete for GC or any of the subtitles in a stage race, you must ride all of the stages and finish within the cutoff time for each stage, which is usually 120% of the stage winner's time.

If the stage winner finishes the stage in 5 hours, you have to complete it in 6 hours or you are out of the race.

The point's winner is determined by points earned for each stage placing much like a series race. The King of the Mountain is determined by points earned from sprints at the top of significant climbs. The Stage Winner is the first rider to complete that stage. The Team GC is determined by the cumulative times of the first three to five riders on a team to finish in each stage. They don't have to be the same three to five riders for every stage.

Stage races are contests of energy expenditure efficiency. You have to first determine the title(s) your team feels it has the best chance of winning. Then you have to determine the stages where you feel your team can gain the best ground. You ride those stages to gain ground and ride the rest of the stages trying not to lose ground. This is why stage racing requires a combination of offensive and defensive strategies.

On either individual or team GC, you will gain the most ground for the amount of energy expended on climbs and time trials. In the flatter stages, you ride for damage control. In most stage races, riders trying to gain the Points title will concentrate on the flatter stages because it requires less energy per stage to win a sprint than a mountain climb.

For the KOM title, riders focus on the climbs that provide the most points. Teams focusing on Team GC will try to get riders in as many breaks as possible where they can gain the most ground. Teams trying to pickup a stage win will focus on stages, which best suit, the riders on their team. You can see that it is very difficult to win two or more titles.

Weather

Weather often affects the outcome of a race and requires the use of different strategies. One of the most important things you should learn about weather

is that, when the weather gets nasty, most riders start thinking about a nice warm fire, hot chocolate, someone to cuddle with, and the TV remote. They start wanting to quit and go home. Most people can't stand to be uncomfortable and bad weather makes most people feel uncomfortable.

I hope you have learned that when people start wanting to quit, I believe in encouraging them. The best way to do this is by attacking, attacking, attacking. You'll be amazed at how many go hunting the sag wagon. Bad weather is a great strategic opportunity. Race mean when it rains.

Look for opportunities to gain an advantage. You must adapt quickly in bad weather. You will learn to side draft in the rain because the rooster tail coming off of the wheel in front of you will make it difficult to see and chill your body. You will learn to echelon in side winds and anticipate changes in wind direction. You have to learn to think and anticipate what will be ahead of you so you don't have any bad surprises such as sand washing into a corner or oil floating to the top of the asphalt when the rain just starts making the road slick.

If there is a possibility that bad weather may shorten a race, attack to gain the offensive as quickly as possible. Whoever is leading when they call the race wins it.



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Part II • Chapter Eight

Divide & Conquer

Divide And Conquer

It is inevitable that you will find yourself in a situation where you are outnumbered by your competition. Usually, it will be a two on one in a break away. This page will teach you how to beat that team tactic. There will be several different possibilities.

The first will be when they start relay attacking you. The second situation will be when you subtly go on the offensive before they decide to go on the offensive against you. These are both different versions of the concept Divide and Conquer.

Evaluate Your Competition

The first thing you must do is to figure out which of the two riders is the stronger. This is very important because, after you have eliminated the first rider, the second rider will try to outrun you.

If the first rider is the stronger of the two, he will catch his teammate. If he is the weaker rider, he will lose ground to you and his teammate during the chase causing the team to remain divided and weaker. Therefore, you must quickly determine which rider is the weaker of the two.

You also have to watch their riding habits for bad habits and to see where they tend to ride in the big ring (front sprocket.) You are going to look for any weaknesses they have given you to work with because they have not

practiced what I will teach you under riding discipline. You are quietly stalking your competition.

The Divide

The first part of divide and conquer is psychology. You must play like you are probably beat while stalking your competition. You must let your competition think that they have both the tactical and psychological control while you are looking for the opportunity to beat them.

You can't make any boasts or be arrogant. Let them be cocky and arrogant. Hopefully they will become over confident. Use their minds as a tool against them. Surprise is an important tool.

You must learn the quick shift to be effective and must do your acceleration work. The quick shift is done with the chain rings on the front. If you keep your equipment adjusted right, all you have to do is hit the shifter and you will quickly change from a larger gear to a smaller gear without missing or looking. This is only one of many uses for the quick shift. Learn to use it.

You need to work with these riders until the break has opened at least 40 seconds on the peleton so you can have enough working day light between you and the pack to do your dastardly deeds. If they have not started attacking you, then you get to select how you wish to work it. You may want to wait until they start attacking you. We will first assume that they have started attacking you.

You will play the game with them and convince them that they have beaten you. When they attack you, you will cover their attacks. On or after the second or third attack by the stronger rider, you will let him go as if they have beaten you. You will shift your focus back to covering the weaker rider on your wheel. The stronger rider will ride hard to open ground while you

play cat and mouse with the rider on your wheel making sure he does not get away from you.

After the faster rider has gained 15 to 20 seconds on the two of you, you will set to make your kill. This kill is usually done in one of two ways using the quick shift.

The first technique requires using a corner through which you both normally ride in your big rings. After you have **BOTH** committed to the corner or leaned into it, you will hit your front shifter causing the chain to jump to your small ring and grab your breaks. You don't want to stop but want to slow down enough that your competitor is lumbering in his big ring because he won't have time to shift before he grabs his breaks.

NOTE: You don't want to knock them down!!! You are trying to force them into a bad tactical position.

The situation is this: You are both going to be jumping out of a corner from a relatively slow speed. You will be in a smaller gear, which will accelerate more quickly than his bigger gear. If you time it right and have been doing your acceleration work, you should open at least 40 meters on him before he can get up to speed. You have broken the draft.

The other technique is to do the same thing on a straight stretch of road. Here, you will probably have to bring the bikes to a track stand. (I believe that every roadie should do some track racing.) Both of these techniques work better if you are jumping on a slight climb.

The Chase

Now you have to understand chase psychology and know how to use it. You are chasing the stronger rider and the weaker rider is chasing you. Therefore, the distance between the two teammates should be increasing

while you are catching the first rider. This is a must. If you guessed wrong, you will have to start all over and it will be harder to surprise the first rider again.

Mentally, there are two ways to look at a chase. Most people see it from the view of the chasing rider having the mental and tactical advantage. You **MUST** use the viewpoint of breaking that rider's mind and using it to beat him.

The first viewpoint is that all the chasing rider has to do is not quit until he catches you and then he can rest on your wheel. This viewpoint says that the rider being chased has the disadvantage because he doesn't have a wheel to rest on if he wins the chase.

The other viewpoint says that if you quit last, the other rider will tire, begin to doubt that he can catch you, and shift his focus to not being caught by the riders or peleton behind. The pros know how to use this and also know that you can **MAKE** it happen.

To make it happen, you go directly into the pursuit mode I described under attack systems and keep opening ground to make him believe that he cannot catch you until you see him give up. Then you maintain the pursuit mode to catch the lead rider. Remember that the winner of the chase is almost always the last rider to quit. You want to make him want to quit by taking the chase to a higher level.

The Conquer

The conquer can be done using two basic techniques. The first one is to get about five to ten seconds behind the first rider who will keep increasing the distance between himself and his weaker teammate by trying to out run you

In this technique, you are stalking your competition, looking for the opportunity to strike. If you do this right, you can drive the front rider mad and cause him to make mistakes. It is a terrible feeling to be hunted by a predator.

The second technique is to catch him and do the same or a similar thing to him that you did to his teammate. With this technique, you may have to tow him for a while to open enough working day light on his teammate to keep from being caught while playing cat and mouse.

Either way, you want to have at least 20 seconds on his teammate before you make your move. If you do this, when you drop the faster rider, he has to decide whether to wait for his slower teammate or chase you. This uncertainty can cause him to not chase as hard. Again, you must use the chase technique I explained above until he drops down into a pace mode from the pursuit mode.

Psychology is so important in tactics. **If you can make someone believe they are beat, then they are beat.**

War Story :-)

I was riding an Albuquerque Tuesday night Criterium in 1976 when I got caught in a break with three teammates. They were the strongest team in the state and assumed that I was dead meat because of their numbers. I never gave a hint that I believed otherwise and used their belief as one of my weapons.

The race was on a one and one quarter mile (two kilometers) Criterium course. It was down a six-lane road with a wide median and back. The start/finish was on the flat stretch at the top of a 2 to 3 per cent half mile grade. The two 180 degree turns were wide enough that everyone took

them in their big rings. The first 180-degree turn was at the bottom of the hill.

I knew the relative strengths of the three riders and positioned in front of the weakest rider. With him on my wheel, I faked fatigue out of the first turn to separate him from his teammates by "getting dropped." This increased their over confidence which I was able to use against them.

When his teammates had about 15 seconds on us, I did a quick shift in the first turn and hit my brakes. He was lumbering in his big gear when I jumped on the climb coming out of the turn. I quickly opened about 50 meters on him and went into the pursuit mode to catch his teammates.

I could tell that the first two riders were not worried because they still had me out numbered and were even cocky about the situation. I liked that and let them believe what they wanted to believe. Even when I caught the two of them working together, they didn't get worried. By the time I caught them, their weaker teammate was out of the picture.

After I caught them, they started relay attacking me. I covered their first few attacks and then let the stronger rider go as if I knew I was beat. I clearly shifted my focus back to make sure the slower rider didn't get away from me while I waited for the stronger rider to get at least 15 seconds on us. Then I did the same thing to the slower of the two riders that I had done to their teammate and in the same corner.

To my surprise and utter joy (though I was careful to not show it) the first rider didn't get worried when I caught him. He knew how to use team leverage to "force me" to tow him to keep him away from his teammate.

When we were about 30 seconds ahead of his teammate, I did a quick shift and hit my brakes about half way up the climb. I took him to a track stand and had him in his big ring. I carefully watched his team mate while playing

cat and mouse and beat him on the jump. I opened at least 40 meters on him and he couldn't figure out whether to chase me or fall back to his teammate who couldn't catch him unless he slowed down.

I won the race by about 30 seconds. It works.



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Part II • Chapter Nine

Lapping Tactics

Lapping Tactics

Remember that the most important principle of lapping other riders is to eliminate other competition. The more competition you eliminate before the sprint, the better your chances of winning the race. The ideal, of course, is to eliminate **ALL** of the other riders before the sprint.

The most common method for lapping the field is to go on a break of two or more riders. If you are in a field of 100 riders and five of you lap the field, then you have eliminated 95% of your competition and can normally keep them out of the race with a minimum of effort using a little "defensive maintenance." They can get off the front as long as they don't get far enough off to lap the field.

Before you lap the field, you have to decide whether it is to your advantage to finish lapping the field or to just stay on break until the finish of the race.

Lapping the field means that team tactics are brought back into play because your teammates can help you beat the other riders who also lapped the field. But it also means that their teammates can help them beat you. Therefore, you must decide if it will benefit you or hurt you to lap the field.

This is determined by which of the riders in the break has the better team. If you don't have a team or your team isn't as strong as one or more of the other rider's teams who are also represented in the break, then you don't want the lap to take place. If you believe that your team is equal or better

than the other represented teams, then you should want to finish the lap to bring your team into play and increase your chances of winning.

If two or more of the riders in the break belong to the same team, then you definitely want the break to lap the field so you can bring your team into play because their team can already use team tactics. On the other hand, if it is your team which has the two or more riders and your chances of winning are looking good, then you don't want the other riders in the break to get help from their team mates.

Another factor you may want to consider is the relative strengths of the riders in the break. If there is a rider in the break that you cannot beat, you may want to lap the pack regardless of team strengths so you can use the confusion of the peleton as a potential weapon. This may or may not work and you must consider it while on break. If you are beat anyway, then lapping the field is your only hope even if their team is definitely stronger.

When lapping the field always be on alert for an attack when the break reaches bridging distance behind the peleton. The pros will almost always attempt to bridge to the peleton before the rest of the break to help them eliminate the other riders in the break. This can be done in one of two ways. The first way is to get to the front of the peleton before the break can finish lapping the field and start working to pull the peleton away from the break stranding them behind the peleton.

The second and more common way, especially with larger peletons, is to race to the front of the peleton and go on break again with other riders from the peleton before the other break riders can make it to the front of the peleton. This is using a second break to eliminate your only remaining competition.

It is very important when lapping the field for your team to have at least one or two riders waiting for you at the back of the peleton to help you. They

cannot drop off the back and pull you up to the peleton but as soon as you make contact with the peleton they can work with you. They need to immediately pull you to the front of the pack. This is to insure that one of the other break riders does not get off the front before you make it to the front.

Remember that riders who have lapped the peleton don't have to win the field sprint to win the race. The winner is determined by the **RELATIVE** positions of the riders from the break in the peleton when they cross the finish line.

The rider who wins the race may be third across the line while second place may be ninth. The pros know and use this as part of their strategy when setting a teammate who has lapped the field up for the sprint. They use lead-outs and blocking to keep their rider ahead of the other riders who have lapped the field.

It can get pretty hairy at the finish of such a race.

Now go lap somebody. :-)



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Part II • Chapter Ten

Sprinting

Sprinting

Leg Speed

Every top sprinter I have talked to over the years of racing said that the three most important things to being a good sprinter are leg speed, leg speed, and leg speed.

To just have a chance against the big boys in sprinting you have to be able to sustain a leg speed of at least 160 to over 180 rpms.

I have seen world-class sprinters rap up their rpms and blow the roadies out the back. After the race, the roadies would tell me that they were spun out while the sprinter was still accelerating and, often, the roadie was in a bigger gear. The world record for the last 200 meters in a match sprint is a little over 10 seconds and was set in a standard track gear of only 88 inches (49 x 15.)

That is an average speed of 47 miles per hour with a top speed of about 50 miles per hour. Yet, most roadies will spin out in a 53 x 12 (119 inches) well before hitting 50 miles per hour.

There is something wrong with this. 50 miles per hour in an 88-inch gear translates to about 190 rpms. 190 rpms in a 119-inch gear equals 67 miles per hour. No roadie can do that but they should definitely not be spun out at less than 50 miles per hour in a 119-inch gear.

Leg speed, leg speed, leg speed. Think about it. Do your speed work.

Speed Work

What is speed work? It consists of two things. First, spinning low gears on your easy to moderate days to teach your legs to turn quickly. Second, short fast sprints on flat ground with some sort of lead out or a short down hill to get you up to speed before you start your sprint. When you think you are going as fast as you can, kick it.

Do some sprints in a big gear for strength and one or two in a little gear for leg speed. Do a total of two to three such sprints at 100% for no more than 6 to 8 seconds each. Your legs should be too tired to do a fourth one properly.

Let me teach you a little trick Tom Garrity taught me about hyper spinning. First, for sprinting learn to use all of your leg and hip muscles to increase your total strength and muscle movement efficiency. You push down with your upper legs and CALVES and ALSO pull up with the other leg so you are using both your pushing and pulling muscles at the same time to maximize your energy input to the pedals.

If you are sprinting right, you should reach a point where your legs are turning too quickly for all of your muscle groups to have enough time to contract and release. So what you do is eliminate one of the muscle groups to increase the time the others have to contract and release so you can spin even faster. You point your toes down locking your calves out of the action and accelerate.

Another little trick here is that; in order to spin really fast and not bounce on your saddle, pull on your handlebars in a way that you will be pulling your legs and body down into your pedals. These two tricks will increase your leg speed during a sprint. These tricks plus practice will improve your sprint.

But there is much more to sprinting than leg speed. Sprinting is basically timing, positioning, acceleration, and top end speed.

Acceleration

The goal in acceleration is to move your body mass from one speed to the highest possible speed as quickly as possible. This requires maximum leg speed and strength.

All of the road and track sprinters I have known did acceleration work by bringing their bike to a stand still in a standard track gear or a road gear of about 60 to 66 inches (39 x 18 to 39 x 16) and try to be moving as fast as they can within from 75 to 125 meters. Remember to push AND pull with both legs at the same time. Do a total of two to three such sprints at 100%. Your legs should be too tired to do a fourth one properly.

A game I used to improve my riders' acceleration was to have regular two-up, match sprint drag races. Using road bikes in 60 to 65 inch gears, they came to a stand still side-by-side, I blew a whistle or shouted go, and they sprinted for a finish line 50 meters away.

It was fun and they got a great workout.

Timing

You must practice and learn what your best sprint distance is. For most riders, their best sprint distance is from 150 to 200 meters.

The amazing Skip Cutting was best at from 50 to 75 meters. His acceleration was so good that he could come around up to two or three riders in just 50 to 75 meters. Learn your best distance **AND IT SHOULD NOT BE 600 METERS.** If your acceleration is that slow, take up cross-country skiing. :-)

Roadie Sprinting

Phil Anderson used to have a terrible sprint, which was really just the typical roadie sprint. He would reach a point at about 600 meters from the finish, put it in his biggest gear, panic, and charge for the finish, leading all of the good sprinters out for the sprint. He would blow up about 200 meters from the finish and everyone would blow by him. Late in his career, he got help, learned to wait for the right moment, and started winning sprints.

This is the same problem most roadies have with sprinting. They don't know how to sprint right, put it in their biggest gear, panic at about 400 to 600 meters from the line, and lead everyone else out.

I used to teach my riders to go to the front, wait for some roadie to panic, jump on his wheel, and win the sprint. You can bet on it happening in almost every road race sprint. 200 meters or less should be your best sprint. You should be able to accelerate as quickly as possible all of the way to the finish line. If you stop accelerating before the finish line, they're going to blow by you like you're chained to the road.

Positioning

The ideal to strive for in a road sprint is to be in second place and fresh 200 meters from the line. If you are in third place at 200 meters from the line, you have to travel one bike length faster than the rider in second place for the last 200 meters just to tie. You have to travel one bike length plus one inch faster to win. That decreases your chances of winning.

Every bike length a rider is behind the first sprinter decreases his chances of winning by one more bike length. You want your competition to have to travel faster than you to beat you.

Of course, all good sprinters are going to want to be second at 200 meters. This is going to require a lot of discipline and tactical positioning. Then there is always the guy who goes at 400 to 600 meters and either sits up or blows at 300 meters leaving you on the front. Oops. Should have used a team lead-out and better learn to win from the front really fast.

Winning From The Front

Winning a sprint from the front is tricky and takes a lot of practice. The basic concept is to keep the pace fast enough so that, if anyone should jump, they will be going too close to sprint speed to not be able to accelerate by you too fast for you to make their wheel or match their jump while not blowing your legs out before the line.

It is very tricky and requires you and your friends doing weekly sprints and taking turns leading out. Keep the speed high but not too high.

Team Sprinting

Team tactics take a lot of the guesswork and luck out of sprinting. When your teammate leads you out for the sprint, you know he isn't going to sit up at 300 to 400 meters leaving you stuck in the wind. The goal of a team lead-out for a sprint is to make sure that your sprinter is in the second place position with at least one bike length on the next rider from another team when he likes to start his sprint. This also takes practice.

The lead-out rider(s) go to the front with their sprinter on their wheel. They take the pace up fast enough to keep other riders from trying to pass or riding along side of their sprinter. The ideal lead-out will force the front of the peleton to string single file so that each next rider in line is one more bike length behind your sprinter.

It is only common sense that this condition will make it so that only the first few sprinters have a chance at winning the race. You are decreasing their chances of winning while increasing your rider's chances of winning. It is like a pre-sprint sprint only a little slower. The last lead-out rider should blow his legs at the point your sprinter starts to come around.

A good lead-out rider will keep track of what is going on behind him like his sprinter getting bumped off his wheel. He should also discuss the last 400 meters with the sprinter. Let's say there is a curve about 200 meters from the line. The lead out rider should let himself drift away from the inside curb to let his sprinter have the shortest possible line while forcing anyone trying to pass to take the longest possible line. Yes, sprinting requires thinking, very quick thinking.

The lead-out you use, like all other tactics, will be determined by your fitness and experience levels. If you are not a pro, don't try to do those long pro lead-outs.

I had some cat 3's who wanted to try a one-mile lead-out like the pros in a race that always came down to a pack sprint. I told them that they didn't have the fitness level to sustain a lead out for a mile. They should keep their lead-out down to a half-mile or their legs would blow at about 300 to 400 meters, leaving the sprinter as a lead out for the other teams.

During the race, they decided that I was wrong and they could do a pro lead out and decided to do a 3/4-mile lead out. At 400 meters, the last lead-out rider blew and the sprinter got to lead out all of the other teams.

Pros can do what they do because they are fit enough to be pros. If you are not fit enough to be a pro, don't try to do what they do. Modify it to your fitness level. I did that a lot and taught different tactics to the different categories.

Releases

The release is another tool used in sprinting to increase the chances of your team sprinter winning the race by increasing the distance from your sprinter's front wheel back to the next sprinter's front wheel.

To perform a release, a teammate (the brakeman) positions on his sprinter's wheel and, at a strategic point, simply eases off his pedals (soft pedals) just enough to let his sprinter and lead-out rider pull away. By just being between the next sprinter and his sprinter, the brakeman pushes the next sprinter one more bike length behind his sprinter. The release forces the next sprinter even farther back, decreasing his chances of passing the brakeman's sprinter even more.

Where are the best places to release your sprinter?

In the last corner or at 300 meters to go. You want it to be close enough to the line so there isn't much chance in the rider behind you pulling the next rider behind him back up to the sprint train before the sprint actually begins.

The faster the riders behind you have to go to reach the line before your sprinter, the less likely they are to beat him.



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Part II • Chapter Eleven

Leg Speed

Leg Speed

I was recently sent an article from the Internet about a new world record for stationary rollers by one of my riders. It states that on September 16, 2000, 44-year-old Manfred Nuscheler set a new speed record for stationary rollers in Berne, Switzerland.

The new record is 164.1 km/hr and he did it on a 54x11 gear with a "standard bike" (it didn't say whether it was a track bike or road bike just a Moser frame with Campagnolo) on Minoura rollers.

This required him to ride at between **269 rpms and 284 rpms**. Not bad for an old man, huh? (Unfortunately, this is quite a bit younger than me.:-))

Food for thought:

If you put 284 rpms on a lowly 52x14 on the road, you will be doing 83.48 mph (133.57 km/hr.)

That is fast enough to beat anyone in a road sprint. With leg speed like that and the strength to turn the gear, who needs a 53x11?

And talk about acceleration!!! With leg speed like that and the strength to turn the gear, you wouldn't even have to use the big ring to beat Cipo. :)

That is better than 2.5 times the hour record using the same gear Eddy did.
Hmmm, where did I put my rollers? :-)

Can we say Leg Speed, Leg Speed, Leg Speed?



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Part II • Chapter Twelve

Climbing

Climbing

I want to use this chapter to better explain what climbing is and involves. I want to cover fitness (strength to weight), leg speed, technique, and psychology.

Fitness

Fitness is one of the most important aspects of climbing. Again, I need to stress speed. Any time you are trying to get somewhere first, it requires being faster from here to there. Faster always requires speed. **If you don't do your speed work, you chase those who do.**

The best climbers often do their speed work by attacking on the steepest climbs for speed and strength.

The most common mistake made in training for climbing is to just set a pace that will get you to the top of the climb. You must do sprints to increase your climbing speed or you will not improve your climbing speed very much even over a period of years. I have known racers who train this way and have not had a noticeable improvement in climbing speed for over 15-years of racing.

One of the most important aspects of climbing fitness is the strength-to-weight ratio. Assuming that your muscles maintain the same climbing strength with you weighing 100 pounds and 200 pounds, you will be able to climb about twice as fast at 100 pounds. Almost everyone tries to address this problem by dieting. The trouble with this is that you can lose large

amounts of irreplaceable muscle mass while dieting which will permanently decrease your total maximum climbing strength. You have to lose weight at a maximum of about 3 to 5 pounds per week to minimize muscle loss.

If at all possible, I prefer to address this problem from two aspects. The first is weight loss and control through training and a reasonable diet. The second is to put most of my emphasis on strength gain through good training instead of on weight loss.

Leg Speed

The biggest mistake most racers make in climbing is to push too big of a gear. This mistake is most common among large riders who have developed the bad habit of using their greater weight to help turn a big gear on the flats. They have a very strong tendency to put it in a big gear and get dropped. This is because climbing in a big gear kills your legs much faster.

The next time you watch a tape on the Tour de France, watch the climbing parts with a stopwatch and time the riders' leg speed. You will see that the best climbers keep a cadence of at least 70 to over 80 rpms. They will attack at leg speeds of 80 to over 100 rpms. If you don't learn to keep your leg speed up, you will keep killing your legs and getting dropped.

I like to relate this to lifting weights. Let's say you can bench press 200 pounds. If you put 100 pounds on the bar, you will probably be able to lift the bar at least 10 to 20 times. But, if you put 200 pounds on the bar, you will only be able to lift it once.

Let's say you have 30-inch arms. This means that you are lifting the weights 2.5 feet with each lift. For the 100-pound weight, you will do 2.5 feet x 10 repetitions x 100 pounds or 2,500-foot pounds work. With the 200-pound bar, you will do 2.5 feet x 1 repetition x 200 pounds or only 500-foot pounds

work. With the lighter bar, you will do 5 times as much work because the heavier bar fatigues your muscles so much sooner.

The same is true with the gears on your bike to a point. The larger gear will fatigue your muscles sooner permitting you to do much less work or, in this case, climb less far up the mountain before fatiguing. The exception to this is by going to too low of a gear where you will actually fatigue the muscles more quickly by doing the repetitions too quickly.

The real secret here is the same as for time trialing. He who can develop the fitness to SPIN the biggest gear up the climb at a speed of between 70 and 100 rpms will probably be the fastest climber. You must develop this fitness gradually or you can do knee damage by trying to push a gear up a hill which your body has not developed the proper fitness to handle. In other words, don't get stupid and try pushing too big of a gear up a hill.

Technique

One of the things that few riders learn about climbing is what I call carrying your momentum. Most riders will slow down to shift to a lower gear before the climb starts. The best climbers will carry their momentum as far up the climb as possible while making gearshifts when their rpms reach a critical point. This is where you know that, if you don't shift, you will lose too much speed and begin to lumber in the next ten to twenty meters.

If you want to learn to be a really good climber, you must learn to shift on the climbs. The way to do this is to wait until your leg speed is at the critical point I described above. Just before you shift, you lean on your pedals just enough to bring your speed up a little then ease off your pedals just enough to permit the shifter to move the chain while you make your shift.

If you do not ease off the pedal, the extra resistance on the chain caused by climbing will keep the chain mounted on the sprocket and keep it from

shifting. You must ease up during that second that you make the shift. You have to soft pedal long enough for the sprocket to make one revolution.

You will slow just slightly while making your shift and this is why you need to do a slight acceleration before the shift. This way, you will slow to the proper cadence while making your shift and will be able to keep your cadence up even right after the shift. You will have to practice this technique while training or you will miss your shift in a race, which will kill your momentum and your legs.

You will often read or hear the argument about should you sit or stand when climbing. Both sides are right and they are both wrong.

You should learn to do both when climbing. The reason for this is that, when you change your position on the bike, you change the range of motion of your legs. Any time you change the range of motion of your body, you are changing at least some of the muscle cells you are using. By changing the muscle cells you are using, you permit the tired cells to rest while working other cells.

By changing back and forth between sitting and standing while climbing, you are shifting the workload between two different sets of muscle cells resting one set while the other works.

This is similar to riding paceline. By taking turns on the front, you are each taking turns working and resting your muscle cells. The difference is that with paceline those muscle cells are on different people. With standing and sitting, those muscle cells are on a different part of your legs or hips. Because of this it is a very similar principle. Have you ever been climbing, stood up for a while, and, when you sat down, your legs felt better or slightly recovered? This is why.

When you watch the best climbers in the Tour de France, you will see them all riding in and out of the saddle. They have learned this from experience even though they may not know how or why it works, they do know that it works.

Psychology

Psychology is one of the most important aspects of climbing. You have to be able to focus on your speed in relation to gearing and topography to keep your effort at its maximum.

If you focus on anything else such as reaching the top or how far you have to go, you won't make the top with the others. By focusing on your pace, gears, topography, and tactics taking place, you will be able to limit the pain you feel.

We have learned in science that if you permit your mind to focus on the pain and fatigue, you will feel it more. Therefore, you must focus on the race action and not on the things, which will cause you to notice the pain and fatigue. You must also realize that the more you can make it hurt in training for your sprints, the less it will hurt in the race. The more fit you are, the faster you can go before it starts to hurt.

There is another secret here that only the best riders and coaches know about. As your fitness level improves, it causes biochemical changes in your nerve cells increasing your pain threshold or the amount of nerve stimulation required to cause a nerve transmission. This has two effects.

First, it will take much more effort to cause the nerves to transmit their pain signal. Second, we have learned that the pain signal changes with fitness development. A pro does not have the same pain sensation that a cat 5 amateur does. The pain sensation of a cat 5 amateur is like someone stabbing him in the leg with a knife. The pro will have a pain sensation from

a fatigue ache to a very dull fatigue ache which can be completely overriden by the pleasure sensation of exercise.

If you have ever been in really good climbing shape, it is exhilarating to hammer up a mountain as hard as you can. In other words, it feels good instead of bad to go really hard. That is a great feeling.

Understanding this can make it easier to push through the pain in fitness development towards achieving that end.



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Part II • Chapter Thirteen

Multiple Placings

Multiple Placings

In one of my other chapters about tactics, I mentioned how I taught the University of New Mexico Lobo Cycling Team to not only win a race but how to take multiple placings. Remember that they took the first eight places and tenth in one race. This is a more advanced form of the offensive technique for breaking teams down with relay attacking to establish the winning break.

The process starts with the normal offensive control and evolution of the peleton as described in earlier chapters. If you have not read that process, then you need to stop reading this until you have read about that process or this chapter will not make sense.

When you have reached the point to where the peleton has been evolved and you have sent a rider up the road for the win, then we start building another story. You wait until the rider on break is 15 to 20 seconds up the road and then launch another teammate after him. From here, it gets touchy and is a balancing act.

The second rider you send up the road must know that he cannot permit his attempt to bridge to his teammate threaten his teammate's break. Any time a rider is launched after a teammate, the teammate's break has to be considered more important and must be protected. The following rules are a must.

(1) If the second rider's attack stimulates a chase that may threaten his teammate's break, he must shut down and let the pack catch him.

(2) If a rider from another team gets off with him, he must shut down and take him back to the pack. But he must be prepared to counter an attack from that rider when he shuts down.

As soon as your second teammate goes up the road and it is decided that it has potential as a bridge to his teammate, the rest of the teammates must begin supporting his attack by blocking and covering attacks from other teams.

As soon as the second rider catches the first rider on break, they form a paceline and go into the pursuit phase to open ground quickly. They want to put at least 40 seconds on the peleton as soon as possible so the other teams will shift their focus back to the peleton to race for third. This will secure their break and set up the remaining action.

As soon as the first two riders are 40 seconds up the road, the team starts over being careful not to endanger the first break. The preceding break is always more important because it is for a higher placing. It must be protected and I cannot over emphasize this.

At this point, another "first" rider is sent up the road on break under the same rules as above. As soon as he is at least 15 to 20 seconds up the road, another rider is sent to bridge up to him exactly like the second rider bridged up to first rider in the first break. When these two riders hook up, they go into the pursuit phase to open ground as quickly as possible. Again, they want to open a 40 second lead as quickly as possible.

This process continues as long as your team has enough riders to support the action and there is time left in the race. You always use your team leverage to force the other teams to do the work and set up each next attack while continuing to tire the other teams out.

Another bridging possibility comes from covering the other teams' attacks. This is especially true towards the end of the race when the other teams get desperate.

When a rider from another team attacks and decides to go for the break even with you glued to his wheel, use your team leverage to force him to do all of the work in bridging while you rest. Just say, "I can't work against my team mate. If you want him, you have to catch him." If nothing else, tell him your coach will kill you if you work against your teammate.

Then you sleigh ride until you are about 30 to 40 meters behind your teammate. At this point, attack; dropping the other rider, and bridge to the break. If the other rider jumps on your wheel, shut down and refuse to work. Either he will tow you all the way to your teammate or you will bridge without him. Don't give him any other choice.

If you succeed in bridging to your teammate without the bridging rider from the other team, you must eliminate that other rider as quickly as possible. The way you do this is, when you are about to catch your teammate, you shout, "Get on my wheel!"

You must make sure that your teammate gets on your wheel (unless your teammate is too blown to stay with you.) As soon as the hookup is made, you tow your teammate away from the chasing rider before starting the paceline.

This leaves the rider from the other team stranded in the middle between the break and peleton with tired legs. If this is done right, the rider from the other team will blow and go back to the peleton unless he is strong enough to stay on his own.

As more riders go up the road, the riders from the other teams feel more and more that what is left is not worth the effort and will give up. This

makes it easier for additional riders to go up the road. You are using psychology to help you pick up the additional places.

An excellent example of this was when the Wheaties pro team entered four riders in a Criterium in Los Angeles.

They used this technique to take the first four places. It works.



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Part II • Chapter Fourteen

Mountain Bike Racing

Mountain Bike Strategy

To study mountain bike racing strategy, I want to use an analysis technique to teach you how to analyze a sport to better understand it. This will benefit roadies, trackies, and cross racers as well as mountain bikers. You will also see how tactics and fitness are so dependent on each other.

The Race

Most mountain bike races consist of about four basic parts. The start, single track racing, short passing areas, and downhills. 80% to 90% of most races are single track where it is almost impossible to pass. This means that the places where you can pass are the most strategic.

Therefore, we need to analyze the tactical and fitness characteristics for these three parts of the race.

The Start

The start is one of, if not the most important strategic part of most mountain bike races. Everyone quickly sprints for the lead or positioning before the race squeezes into a single track where you can't pass. The components of the start are acceleration, speed, recovery, and getting your foot in the pedal fast at the starting line.

You need the best acceleration to increase up to your highest speed in order to beat everyone to the single track. This means doing your speed work and acceleration work the same way that roadies should for sprinting.

Interestingly, your most important sprint is at the start of the race. Remember, leg speed, leg speed, leg speed.

Now for a little motor skills development.

You must practice getting your foot in the pedal as quickly as possible. The more you practice, the less often you will miss at the start of the race. You should do a lot of standing starts, like at stop signs and stop lights. These can also be used for the acceleration and speed work. Make it fun by practicing it with your friends and racing for a spot about half a block to a block from your start.

But, after you beat everyone to the single track, you have to be able to recover as quickly as possible to keep racing and not just barf. It doesn't do you any good to get there first if you quickly croak and go backwards. This means doing your interval training.

Passing

Since your passing opportunities are short, few, and far in between, it is important to be able to pass quickly and as many riders as possible.

Again, we are talking about acceleration, speed, and recovery. But we are also talking about timing and bike handling. The best way to practice this type of flying acceleration, speed, and recovery is to get in a good Criterium or road race and attack your brains out.

This is why most top mountain bikers are also top roadies.

Down Hill

Down hill racing for mountain bike racing is mostly motor skill development and upper body strength development from practicing downhills and weight lifting.

Then there is the no fear part. Just practice being insane. It'll work. :-)
Actually, practice increases ability and ability increases confidence.

Some things I would suggest to help your sense of balance and body control would be to take up a balance oriented sport during the off season for cross training. These include such things as gymnastics, diving, trampoline, martial arts, collegiate wrestling, and ballet.

These activities will also help you decrease your risk of injury when you do crash.

Single Track

For the single-track part, you normally race at a relatively steady pace for miles. This means that you need to work on power, which is the same thing as time trialing.

You also need to work on climbing and your patience for spending miles plugging along behind riders who are slower than you. You can see my training section for road racing to get ideas on training for these requirements.

You can use the same techniques because you are trying to develop the same muscles in the same way. For the patience thing, just practice watching grass grow. It will be about as exciting and frustrating (especially if you don't plant any grass.)

The best thing is to remember that the backbone and success of any sport are the weekend warriors or Fred's and Betty's. Without them, the sponsors go away.

Strategy

So, now what are the recommended strategies other than proper training? Let's start with the start. Get a good starting position, start in a low gear for quick acceleration, and don't miss with your foot.

Passing Area Strategy

Just before you get to a passing area, back off from the rider ahead of you and start your jump so you will have your speed up just when you reach the passing area.

You should try to time your pass so that you reach the rider in front of you at the same time you reach the passing area. This will give you your maximum speed for the maximum possible distance in the passing area and increase your chances of passing other riders and increase the number of riders you can pass.

This is an old trick from track racing. If you practice and get it down, it works.

Blocking

Read my page on blocking to get a detailed analysis. The long single-track stretches make it possible to use blocking as both an individual and a team tactic.

Let's say that you are just a little weaker than a competitor but you have decent speed, acceleration, recovery, and read this page. You can go just fast enough on the single track to do your maximum pace and the single track will keep them behind you.

Then surprise the riders behind you by jumping and opening a gap just before the passing area so they won't have time to get around you before you re-enter the single track. After you reach the single track, you shut down and rest while holding your competition behind you.

You can use the exact same tactic to hold riders back and give your teammate(s) a lead. Before you try this, read my page on blocking.



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Part II • Chapter Fifteen

Track Racing

Track Racing

Track racing strategy is dependent on a number of factors. These factors include the type of Velodrome, the event, and your relative fitness levels.

This chapter will consist of a series of essays to address the basics on these aspects of track racing. In developing tactics, you take the basics and apply them to the specific situation. This page will start with an essay about Velodrome effects on tactics.

Velodrome Strategy

The size and shape of a Velodrome affect the strategies you use in track racing. There are three basic size groups for Velodrome. These include 333.3 meters and larger, 250 meters (the most common size), and 200 meters or smaller. There are also three basic shapes for Velodrome as defined by the UCI.

Size

Most experienced track racers prefer the 250-meter track for general-purpose track racing. Tracks of 200 meters or smaller are most commonly used for indoor racing, usually six-day racing.

The larger 333.3 meter or more tracks are least common and only really became popular in the US during the late 70's and early 80's because of a false classification of them being an "Olympic size Velodrome" in spite of the fact that the 250 meter track is the most common sized Velodrome used for the Olympic Games.

Tracks of up to 500 meters are used for gambling oriented racing in Japan. Most of the track racers I have known referred to the larger tracks as banked Criterium courses because they don't have the tactical dynamics of the smaller tracks.

It should be common sense that the smaller the track, the easier it is for riders to lap the field. Therefore, more riders in the same pack are capable of lapping the field on a smaller track than on a larger track. This causes more riders to ride more aggressively on smaller tracks with much more attacking.

I have found that only about 1/3 of the riders who can lap a field on a 250-meter track can lap the same field on a 333.3-meter track because of the extra 83.3 meters they must bridge.

If you figure that a rider on his bike takes up about 2 meters front to back and you have a 20 rider pack strung single file, that pack is 40+ meters long depending on the distances between the riders. The gap you would have to bridge from the front of that pack to the back in order to lap the pack would be 210 meters on a 250-meter track and 293.3 meters on a 333.3-meter track.

Because of this, more riders will set their strategy for winning a point's race on a 333.3-meter track to winning points from sprints while more of them will focus on lapping the field on a 250-meter track.

It is also important to understand that the banking on a Velodrome are the most strategic aspect of a Velodrome, especially for attacking and sprinting. On a 250-meter track, there are 8 bankings per kilometer and only 6 bankings per kilometer on a 333.3-meter track.

Therefore, a 250-meter track has $\frac{1}{3}$ more tactical opportunity per kilometer than a 333.3-meter track. This is very important for almost all events. For sprinting purposes, there is only one banking within the last 200 meters on a 333.3 track but two bankings in the last 200 meters with a 250-meter track.

On the other hand, the turns are tighter on a 250-meter track, which increases G forces and friction resistance slowing the riders down in the turns.

The tighter turns on a 250-meter track require a more precise lean going into the turns than on a 333.3-meter track. If you miss the lean by just a few feet at race speed on a 250-meter track, you can find yourself struggling to stay off the top rail but you will not even notice the same miss on a 333.3-meter track. The smaller track requires and, therefore, teaches better bike handling and control.

When I was doing some fun racing on the tracks in Los Angeles, some roadie friends of mine had just started track racing, had only ridden on the 333.3-meter track in Carson, and came up to do their first ride and race on the 250 meter track at Encino.

When their cat 4 pack jumped to race speed from a rolling start and hit turn one, they suddenly found themselves struggling to keep off the rail in the tops of the turns unable to race at all and scared to death. They were on the verge of crashing every time the pack hit the turns. They should have done a training ride on the smaller track before trying to race on it.

On the other hand, riders going from a smaller track had fewer problems riding their first race on the 333.3-meter track after racing on a 250-meter track. All they had to do was adjust their strategies to the larger track with fewer bankings per kilometer.

Of course, time trialists prefer the larger 333.3-meter track for a higher sustained speed but sprinters and most other riders prefer the shorter 250-meter track for its explosiveness and lapping potentials. Besides, if you like roller coasters, it is more fun to pull the few extra G's in the turns on a 250-meter track. :)

On the other hand, the really short tracks used for indoor six-day races require the use of steel bars and stems because the extra G's in the extremely tight turns increase the tendency to snap the aluminum bars and stems plus the extra G's beat your shoulders up really bad. These shorter tracks and six-day racing also require more shallow frame angles and more fork rake to absorb some of this track shock and save your body. Six-day racers will often wear two or more pairs of shorts for extra padding to save their butt's in the very sharp turns.

On these extremely short tracks, it can be impossible to see past the rider in front of you because you can't turn your neck up that far. This limits you to seeing attacks until you are on the straights and makes it impossible to see and miss a crash when in the turns.

Shape

The three basic shapes for Velodrome are the sprinter's track which has longer straights for developing top speed in sprints and shorter, slower turns (commonly referred to as cigar shaped), the "oval shaped" track which has shorter straits with longer, faster turns for a faster sustained speed and is designed more for pursuing and time trailing, and the general purpose track which is about half way between the two other tracks in shape.

The general-purpose track is the most common and most commonly recommended by the UCI. It is considered best for local and developmental programs.

It should be common sense that you should wait to stage your last and explosive kick in a sprint on the cigar shaped track until coming out of the last turn because the banking will keep your speed down and waste energy. But the oval track requires a more wind-up oriented sprint. The general-purpose track allows a good, explosive sprint to develop sooner.

Also, the cigar shaped track would be more difficult for beginners to learn to ride and race on because of the extreme nature of the turns. You would get more crashes in the lower categories.

Events And Fitness

It should be common sense that the different events and levels of fitness will require different strategies and tactics and/or limit strategies and tactics. You have to remember that a track race is really nothing more than the finish of a road race. Since the finish of a road race is very aggressive and explosive, then a track race will tend to be just that aggressive and explosive for most of the race.

For most of you, you will probably never ride a track race of much more than 20 kilometers with most events being less than 10 kilometers or about six miles. You have to plan fast, think fast, and move fast or lose fast. You must be very warmed up before the events starts or don't bother showing up.

Pack Races

You will find that most of the stronger riders will use the same basic strategy for pack racing on the track that roadies use. This is to break away and lap the field in an attempt to eliminate as much competition as possible before the sprint starts. This means that, on the shorter tracks, if you don't ride to lap, you don't ride to win.

This will be true for all the pack races except the Miss and Out. The miss and out will be a series of two lap surges and sprints until you are down to the last three riders. At that point, the event becomes a three-up match sprint.

One of the most important tactical lessons to learn for track pack racing, especially the miss and out is to not position right behind the lead rider in the pole position. You will get boxed very quickly and eliminated.

Match Sprints

The match sprint is a positioning and timing game to set up for a final sprint. It normally consists of from two to five riders where the rider who takes the best two out of three sprints wins.

This is the ultimate strengths and weaknesses game because you have to know your strengths and weaknesses, your opponent's strengths and weaknesses, and be able to match your strengths to their weaknesses using tactics. If you guess or move wrong, you lose. It is like Wild West gun fighting except that you have to be shot twice to die.

A very basic rule you have to always remember is that, if you are slower than the other guy, you must lead into the last 100 meters to force them to come around you. It should be common sense that you cannot pass a faster rider at top speed and must force them to pass you.

You will spend most of the race trying to control the timing and positioning so you can get the best start or jump. Based on relative fitness and other conditions, you may want to take an early flier or force a late dash to the line. Do you have better top end speed or acceleration? If neither, good luck.

Pursuits

Both individual and team pursuits are very short time trials against another rider or team. On the shorter tracks, you may want to lap your competition and put them out early or you may want to just out pace them for the entire event. You have to understand that, if you try to lap and don't succeed, you could blow up and lose the race. Should you take the risk?

This event takes a very special type of discipline required to keep to your game plan unless you are in immediate danger of being lapped. Most of the time, you have to ride completely within yourself. It is interesting that most pursuitists prefer to do a lot of road and mountain racing most of the year and only focus intensely on pursuing just a few months before special events.

Kilo

The one-kilometer individual time trial is a mix between a sprint and a time trial. It is a very explosive and intense time trial.

Basically, you jump to get it up to your top speed as quickly as possible or in the first 200 to 250 meters, float for about 500 meters, and then give it a hard kick at the end. The floating is soft-pedaling just easy enough to let your legs rest a little without losing speed.

Fitness

As in road racing, your fitness determines which tactics you can use and how you must develop them.

A slower rider will have to lead into the last sprint because he can't pass the other rider at speed. A weaker rider who can't lap will often have to settle

for racing for what is left. A really fast sprinter may prefer to go for the sprints in all events and a pursuitist will be more inclined to go for the break.

You have to ask yourself, "What are my weapons in relation to my competition?"

If you have a higher top end speed, then you want the sprint to develop early enough for you to reach that speed at the line or sooner. If you are slower but have better acceleration, you will want to delay the sprint so you don't exceed your top end speed before the line. If you have better power and a weak sprint, you will want to take fliers even in the matched sprint. But, even then, you have to ask yourself how long a flier can you sustain.

It is also important to understand that it requires extra effort and fitness to move up the track in the banking to go over the top of or pass another rider. It is like riding up hill. If you are not fit enough, this alone will cause you to lose.

It is also important to understand that track racing involves riding a number of heats or events. This requires having good recovery.

If you don't like interval training, you won't like track racing.



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Part II • Chapter Sixteen

Women's Racing

Women's Racing

Women's racing has a number of problems that need to be dealt with. The two biggest problems facing women's racing are aggressiveness and coaching.

I found that the two biggest differences between men and women's racing was aggressiveness and rate of tactical development. Men tend to want to attack their brains out without thinking and develop tactically more slowly while developing physically more quickly.

Women tend to race much less aggressively and think their way through the race. Women develop tactically faster and physically more slowly.

I managed to teach my women to race as aggressively as my men while learning to use complex team tactics and it was incredible. They took home more than half of the wins and more than half the top six placing in the last year I was coaching them. Any woman's team, which learns to race as aggressively as the men and use complex team tactics, will become one of the best women's teams in the US.

The coaching problem began with the bike boom of the early 70's. There was a sudden increase in the number of racers to the point that most beginning racers didn't have the opportunity to learn from experienced racers. Suddenly there were huge packs of category 3 and 4 riders who didn't have a clue about bike racing and team tactics.

Feed into this trackies who were used to racing in a truly individual sport (track racing is not a team sport) and also knew nothing about team tactics. But they did know how to sprint and commonly used the tactic of sitting in to save it for the sprint. They regularly beat the new roadies who didn't know how to handle this threat with team tactics.

Therefore, a lot of roadies adopted the same tactic of sitting in to save it for the sprint.

This strategy of sitting in to save it for the sprint is a purely defensive strategy that involves two things. First, the riders spend the entire race making sure no one gets away before the sprint. Next, they spend as much time as possible resting for the sprint. No one controls the race, evolves the peleton, and works for a winning break. It is very negative and boring racing.

It is amazing how few people in US racing even know the basics about the complex tactics I teach in this book. Many of the top people in the USCF still believe that, tactically, nothing happens in the first two thirds of a race. The truth is that properly trained teams fight for control of a race from the very start and begin evolving the peleton to prepare for a winning break.

When you watch the famed Hell of the North (Paris-Roubaix) the break that always takes off well before the cobbles (unknown to our brilliant US media) is a controlling break meant to give certain teams a shared offensive control of the race. Those pros aren't busting their butts that early in the race for nothing.

Years later, these defensive riders whose only tactic was to sit in and save it for the sprint became coaches and could only teach what they knew.

These coaches were almost all of the coaches for the lower categories in men's racing, women's racing, and junior racing. It should be only common sense that, if all of the coaches are teaching their riders to sit in to save it for the finish, the racing will be completely defensive and boring. I have seen women's races where every team spent the entire race riding along watching each other while waiting for the sprint.

Women were regularly chastised for riding so defensively. The truth is that it wasn't the women's fault because they were just riding the way they were coached to ride. They were simply doing what they had been told to do by their coaches. Ironically, many of the women's critics were the coaches who had taught them to race defensively. Riders can only race the way they are coached to race.

All but a few of the coaches who had learned complex team tactics went into men's racing and quickly rose to the top. This meant that most riders, especially at the lower level and other classes, didn't have access to their knowledge.

So whose fault was all this negative coaching?

Actually, it was caused by circumstance. The coaches can't be blamed for not learning something they were not exposed to and, therefore, were just doing their best with what little they had been able to learn on their own. Unfortunately, you can only teach what you know. So most of the women's coaches were teaching women to sit in to save it for the sprint, which produced incredibly defensive and boring racing.

This problem is one of the main reasons for this book. I hope this book will help undo the loss of knowledge caused by that bike boom. That is why this

book is designed to include riders, coaches, managers, and everyone else involved in cycling.

This problem was so bad when I was coaching that both Lyn Pettyjon and Eddy B told me that they had to spend one to two years completely retraining pros coming to their teams in the use of team tactics, if they had not come from less than half a dozen teams including my team.

There were a dozen pro teams in the US and half of them didn't know how to use complex team tactics. That is why my little pro/am team consistently did better than most of the pro teams in the US. I don't even remember most of those teams being in the action with the top pro teams and my pro/am team. I know they were there because I saw them before and after the races but I don't have any idea what they did during the races. I never saw them in the action.

If most of the pros were this lacking in tactical development, it is not fair to expect amateurs turned coach to know more. It was just a circumstance we need to get through. You reading this book will help solve that problem.

Pregnancy And Menstrual Cycles

One of the regular problems women have to deal with in racing is their menstruation. Some women have very little effect from their monthly menstrual cycle. Others menstruate more heavily and need to alter their training to take this into account.

When a woman menstruates, the loss of blood can affect her racing and training (or recreational cycling.) Some women are fortunate enough that they menstruate lightly enough so they don't experience any difficulties in their riding. Most women are not this fortunate.

I always had my women cut back on their miles about 5% to 20% depending on how hard they tended to menstruate. This was to permit their bodies to handle the nutrient requirements of the menstruation while still having the nutrients or molecules needed to properly recover from their workouts. If a woman was still feeling a little weak or fatigued too easily, I also had them cut their anaerobic workouts short or do one less anaerobic day to maximize recovery. This seemed to work well enough that we had very few problems with women not being able to compete because of menstruation.

Just remember that menstruation causes the body to need more molecules so that you will have fewer molecules available for recovery from training and racing. Therefore, it should be common sense to cut back on the training to compensate so that the athlete's performance won't suffer.

It is also advisable to see your doctor regularly for a few cycles to see if you should take iron supplements since you are losing blood. Some women may and others may not need more iron. You definitely need to increase your water intake.

Pregnancy presents a problem since a little being is growing inside you while you are training and racing. You need to understand and consider that racing exposes your child to potential injury from a crash. At least consider this when deciding whether to continue racing during pregnancy.

Remember that the small child growing inside you is going to increase the number of molecules your body will need. It requires new molecules for the growth or increase in size of any living organism.

Because of this, it is easy for a pregnant woman to develop a nutritional deficiency when training. You need to work closely with your doctor concerning training and increasing diet. It would be advisable to at least consider cutting back on your miles and some intensity as your pregnancy progresses to help prevent problems.

Work closely with your doctor and see my chapter on Overtraining.



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Part II • Chapter Seventeen

Junior Racing

Junior Racing

Junior racing is very different from other classes in several respects. The biggest advantage to coaching Junior racing is that the longest anyone can have been racing and still be a Junior is nine years. Most of the top Juniors have only been racing from four to six years.

This is very important. In Senior racing, the top riders have been racing at least 10 to 20 years. This means they have had much longer to develop fitness and will be at a much higher fitness level. It will take longer to develop the fitness to just ride at the front with Seniors than with Juniors.

Therefore, you can take a kid off of the street and, with the right program, have them racing and winning in just a few years. Where as almost all Senior riders take at least 10 to 15 years to go from non athlete to just riding at the front with the pros.

A great example of this was in the late 1980's. Warren Gibson got Plymouth cars and Reebok shoes to sponsor the Plymouth/Reebok Junior racing team. He then got the USCF to help him by providing him with a list of the top 35 Juniors in the US.

Warren then traveled around the US interviewing and recruiting 25 of those Juniors onto his team. By the time Warren had finished, there were only 10 of the top 35 Juniors in the US who were not on his team. He and the media boasted it as a monster team and it definitely dominated. All of his Juniors had been racing at least 4 to 6 years.

I recruited half a dozen riders off the street who had never raced and trained them for a few years. My team leader, James Senior, had only been racing two years and his five teammates had been racing from one to one and a half years. Then we went to Visalia to take on the best Junior teams in the nation including Plymouth/Reebok.

The Saturday road race was a little over 70 miles long on a course of about 14 miles with two hills per lap. About 80 to 100 riders started the race with 25 of them being the Plymouth/Reebok team.

Before the race, riders from other teams we knew would drop by our van and tell us how the Plymouth/Reebok team was going to kill everyone and win the race. I didn't say anything about these comments while those riders were there because I knew they would argue to prove their point and their argument could affect my riders' psychology.

I waited until everyone had gone to their team vans for final preparations and told my riders the following. "All of those other riders are going to lose because they told you they will. They have already lost because they have decided that they will lose. But you are going to win and this is how you will do it." Then I gave them their race instructions.

From the start of the race, my riders went to the front, did relay attacking, used control breaks to force the other teams to chase including Plymouth/Reebok, and decimated the peloton. Only 23 riders finished the race.

The first pack had 12 riders, the second pack had 8 riders, and there were three riders strung out behind the second pack. We got first and fifth, had a rider in the second pack, and had one rider chasing for a total of 4 of my six riders finishing the race. We were the only team to have more than three riders even finish the race. Plymouth/Reebok had one rider finish top five, one rider in the second pack, and one rider chasing. It works.

Another big plus to coaching Juniors is that they are more likely to follow and obey a good coach's instructions. Seniors tend to want to try things they see others doing or go their own way instead of following instructions.

Almost all Seniors go through a period of having to learn the hard way that the coach knows best. They will try things opposite from what you told them just to see if you are right. Where as most Juniors will just believe you and do as told.

I had one Senior who injured himself so bad that he put himself out of racing for good because he had to test everything I told him not to do just to see if I was right. He tried to do something on a downhill that I had told them not to do just to see what would happen.

He turned his bike sideways at about 55 miles per hour, broke a number of bones including his pelvis in three places, and wasn't ever able to race again. The way he hit, he was lucky he survived. The only good thing that came out of it was that none of the other Seniors questioned me for several years after that. It is a good idea to follow my instructions. It works.

The down side to coaching Juniors is the high turn over. Most Juniors are only Juniors for about four years before they become Seniors and leave you. You feel like you are just barely beginning to develop them when they stop being Juniors.

Junior Development

Junior development should be done in two stages and those two stages will overlap. The first stage is development and learning and the second stage is serious competition. The truth is that Juniors should always be under a program of constant development and improvement.

Juniors are smaller, lighter, and have a higher strength-to-weight ratio than most Seniors. They also have more dynamic energy than most adults. Because of all of this and the fact that their bodies are still growing, Junior racing tends to be more dynamic than most Senior categories. This creates a greater need to develop acceleration, speed, recovery, and power.

Their races also tend to be much shorter which also tends to shift the required training emphasis from endurance to speed but you do still need to develop 110% to 120% more endurance than their maximum racing distance.

Because of all of this, I have found a very aggressive form of offensive racing to be the best strategy for Junior racing. It does both the development and racing for results in one shot. Keep in mind that it should be common sense that if you can't race aggressively at the front and still win, then you should be in a totally developmental stage until you obtain the fitness to race aggressively and win.

There are so many little growth hormones boiling at the front of a pack that defensive racing will chew your team up really fast. Fitness development is crucial in all classes and categories but more crucial in Junior racing than in any other class. You must develop your kids to race aggressively at the front with a lot of attacking, bridging, and chasing or they will get blown out the back in a good sized pack of Juniors. Fitness is first.

The best way to do this is with a well-structured program and very aggressive racing using the principles I have outlined in all of my other pages. Remember; use your races and training races to focus on intensity training because you can always do more miles after the race. Don't just use your races and training races for miles.

Because of their lightweight and high-energy style of racing, it is very important to stress spinning. Constant attacking and acceleration in bigger

gears will kill their legs. If they are going to do the quick, snappy attacks and jumps that the best Juniors do, they must develop leg speed.

Physics and common sense should tell you that acceleration is easiest to do in a lower gear, especially when it is done a lot during a race. I cannot over stress having the kids attack their brains out until they develop the fitness to attack the brains out of the other kids. It works.

Please pay attention to my comments about growth and overtraining on my page about overtraining. This is very important for Juniors.

Parents

The single biggest problem with coaching Juniors are the few parents who try to compete through their children.

I had a rule that worked with almost all of these parents. I put it to them on day one and reminded them regularly that, when they were on the bike, they were my athletes. When it had nothing to do with cycling, they were the parent's children. It was that or they were off my team. If the child was going to be on my team, I was going to be their only coach. I simply refused to coach against the parents. I laid the law down and stood on top of it. No maybes, my way or the highway. It worked. You have to be very strict with these parents.

I also explained to these parents some basics about how I used a combination of rest and exercise. They were instructed that, if they thought junior was screwing off, ask me and I would take care of it.

Dealing with such parents is the single biggest problem faced by most Junior coaches. I simply refused to let them interfere with my coaching and could because it was my program. The Los Angeles Racing Team was not public property.

Keep It Fun

If it ain't fun, don't do it. That should be the motto of every Junior program.

The biggest problem we have in Junior sports regardless of the sport, is when they become Seniors, they quit within the first year. This is almost always because they were racing because mommy and/or daddy wanted them to race and not for themselves. Sometimes they start out doing it for themselves but the parents become so over bearing because "they are spending so much money for the kid that the kid better perform."

I had a couple of Juniors come into my program when they were about 14. They were the best of friends and started racing because one of them thought it would be **NEAT** and the other one followed.

When they went training or even raced, they would sit at the back of the pack laughing and having fun or they would go zipping up through the pack. They didn't really care about winning or doing team tactics; they were just having fun.

But they were always at my lectures and clinics and did what they were told and rode hard. They were just a couple of fun loving kids who were enjoying going fast and having fun. You could always find them together in the pack.

At the start of their third season, both of their fathers came to me together and asked if I thought they were wasting their money on the kids. Their reasoning was based on the fact that neither one of the boys had even placed in the top six. In other words, they thought they were wasting their money if the kids were not getting placings or results.

I told them that the boys were improving, they were learning a lot, they were improving their health, getting a lot of important life experiences, and

having a lot of fun. Besides, I had noticed that, if you leave kids alone instead of hammering on them, very few get serious about winning before 16 years of age and both of these young men had just turned 16.

Most of these very young super athletes are hammered on by their parents. I told the fathers that it was only a matter of time and their sons would learn enough, get fit enough, and mature enough that they would start winning and placing. It is only common sense that a person will only learn so much and get so fit and they will just start winning.

The fathers saw my logic and agreed to let me deal with it. Two weeks later, the two young men were horsing around in the peleton when they accidentally found themselves at the front because of their fitness development.

They suddenly found themselves in the middle of the very heated team battle being fought by our team and, because of all the learning they had done, reflexed into the battle. They jumped into the middle of the team battle with both feet, became part of the larger team, and started attacking, blocking, and covering attacks. The adrenaline rush caused by the battle carried them away and they helped the team slug it out.

After the race they were so excited that they had to tell me how they had accidentally gotten into the battle and became part of it. They were so excited about helping a teammate win the race and being an active part of the team. A few weeks later they picked up their first placing and both of their fathers came back to me and thanked me. Their sons had just taken another step in growing up.

The most important thing here is that they did it in their own time and because they enjoyed it and not because someone hammered on them. They turned out to be excellent riders and their fathers never regretted it.

Let the kids have fun. If they are having fun, they will want to do it more, will get in better shape, and learn more about it.

Then it is only a matter of time and they will get fit enough and learn enough to start winning and placing. It works.



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Part III • Chapter One

Base Training

Base Training

Base fitness is basically aerobic fitness. With base work, what you are doing is developing your cardiovascular and cardio respiratory fitness and increasing the metabolic fitness of the cells. This work is done with relatively steady state exercise.

The minimum time it takes to really begin to develop aerobic fitness is 20 minutes of continuous exercise.

This is very important and can help you save some money on buying "magic exercise junk" you see advertised on television where they claim to be able to give you a 30 minute workout in 3 to 5 minutes.

This rule of thumb should tell you that it is not possible to get a 30-minute workout in less than 30 minutes regardless of what kind of toy you are playing on. The body simply doesn't function that way. Regardless of the program you are using, the toys you are playing on, or whatever, you must sustain a minimum heart rate of 120 beats per minute for at least 20 minutes to **BEGIN** to develop aerobic fitness at a reasonable level.

With any amount of exercise for even a brief amount of time, you will get a TINY amount of aerobic fitness development over a period of time. But you must understand that for the first 20 minutes of continuous exercise, most of the development you are going to get is anaerobic. You'll learn in the chapter "Weekly Training" that anaerobic development will contribute toward aerobic development if it is done within the aerobic time frame.

Base Development

So, what are we doing to the body with base fitness development? First, we are developing the cardiovascular system. That is the part of your circulatory system, which includes the heart and all the plumbing going out to the body. With the heart, we are increasing the fitness of the heart muscle and the number of blood vessels feeding it.

On the plumbing end, we are increasing the number of capillaries feeding the muscle cells and other tissue where the blood flow is increased during exercise (such as the brain.) Increasing the number of capillaries feeding a cell means that a greater percentage of the cell wall is being bathed by blood. This means that more nutrients can diffuse into the cell and more waste can diffuse out of the cell within a given period of time. Increasing the amount of diffusion in and out of the cell increases the intensity level at which a cell can operate and increases the time for which the cell can operate at a give level of intensity.

Sounds good, doesn't it? Well, it is the most important aspect of what we are trying to do when we increase the fitness level of a person.

You must remember that this process takes time and happens a few molecules at a time. It does not happen over night or in just a few weeks. It will take years to develop the cardiovascular system needed to race professionally. Patience is required.

Another thing we are doing on the plumbing end is to increase the size and muscle cell fitness of your major blood vessels going to and from the body so they can carry more blood to and from the body. The more blood we can get to the body or muscles, the harder we can work and the longer we can work hard. Controlling the blood flow in our bodies is the most important aspect of fitness development.

It takes time to make changes in how our blood flows. If you expect to be able to go from nothing to category one in just a few years, forget it. To be successful in cycling, you have to be in it for the long haul.

To give you an idea of how long it takes, every pro that I knew in cycling who had not had prior athletic experience and fitness development from other sports, took at least 10 to 15 years to become competitive in cycling at the professional level. Aerobic fitness development already obtained from other sports, such as running, decreases this time.

Now to show you how wrong most people, even pros, train, I took my athletes from no prior fitness development to being able to ride at the front with the pros in four to five years. The riders who had some prior fitness development did it in as little as three years. Remember that I only coached the Los Angeles Racing Team for five years and recruited nothing but beginners. Yet we competed with the best teams in the nation by our fourth and fifth years. Also remember that most racers in other programs who ride for 10 to 20 years never make it to the pro level. Think about it.

My training techniques are very radical when compared to the techniques used in cycling but so were my results. It is the results that count. You can take 10 to 15 years or you can take 5 to 10 years. It is your choice, all you have to do is read my methods and use them. Let's see you beat that deal.

With the cardio respiratory system, we are developing two things. Remember that the development of the cardio respiratory system is meant to maximize gas transfer in the lungs. We are developing the lungs and the plumbing, which carries blood to and from the lungs. Basically, the plumbing development works the same whether it is for the lungs or the body.

The development of the lungs involves several things. First we are increasing the volume and elasticity of the lungs themselves so they will function better. We are also increasing the fitness level of the diaphragm and

intercostal muscles, which control our breathing. Most significantly, we are increasing the number of capillaries in the many alveoli (air sacks) where the gas transfer takes place.

Increasing the amount of blood, which makes contact with the gases in our lungs, increases the rate at which the gases can diffuse in and out of the blood. This increases the amount of gases, which can be carried to and from our muscles within a given period of time, which increases the level of intensity we can function at and increases the time for which we can function at any intensity. Sounds good. It works.

Finally, within the cells, we are increasing the metabolic efficiency of the cells. This means that the cell can do more work with less energy and recover more quickly.

Now let's put this all together. We increase the amount of fuels going to the cell, increase the amount of waste going from the cell, and decrease the amount of fuel needed by the cell and the cells will be able to function at a much higher level for a longer period of time and recover faster. We need that. That will definitely make you go faster for a longer period of time.

Base Requirements

So, what do we need for a beginning base fitness level? The standard rule of thumb for cycling before you begin anaerobic fitness development is about 2,000 to 3,000 miles in the last 3 to 6 months. Since most of you are either already racing or have been riding recreationally for a few years, no problem; you probably already have this.

Plus you have to understand that all of those endurance and easy days are going to keep adding to your base development, day-by-day and mile-by-mile. The most significant days will be the days on which you ride your long miles. The easy and rest days are helping your body to rebuild by flushing

your body with a little extra blood and nutrients while not incurring significant cellular damage.

Pre Base Development

There is an exception to the rule of thumb on base miles before anaerobic fitness development. If a person has been very sedentary for a long period of time and has permitted their body to atrophy below a normal functional fitness level, they will require much more base work before they can begin anaerobic fitness development.

You have to realize that such a person has permitted their body to deteriorate to a point where even base work can be hard on their body. This is particularly true for people who have gained considerable weight. Some of this has to do with a survival mechanism built into the body.

To properly understand the human mind and body you have to do what I call "taking it back to the cave". We were designed to function in the primitive setting where we had to hunt and kill our food. We would make a really good kill today and get to pig out but it may be one or two weeks before our tribe could make another kill. Today, we can simply drive down to the store and buy some more food.

In those days, our ancestors had to survive until the next kill was made. So there were a number of survival mechanisms, which have to do with energy conservation designed into our bodies to help us. It requires energy to maintain a certain level of molecular structure in our bodies. If we decrease the number of molecules in our structure, we conserve energy. So our bodies are designed so that, if we don't use certain molecules within 24 to 36 hours after the cells have finished rebuilding, the cells start getting rid of the extra molecules to save energy. We call this atrophy.

In the bones, this process becomes even more radical because there are two types of cells, which maintain our bones. One type of cell creates new bone cells and the other type destroys them. If our bones have not been subjected to a certain level of stress within a given period of time, the body decreases the number of bone cells to conserve energy. This weakens the bones and can go to the extent that they become very fragile.

This is one of the most significant problems we are having with space travel. When our bones are subjected to less or no gravity, they begin to tear themselves down very quickly. If we were to travel six months to Mars with zero gravity, stay there for one year with only 38% of Earth's gravity, and return to Earth with six months of zero gravity, our bones would become so fragile that just the impact of landing in the space shuttle would break bones and either cripple or kill us. Trying to support our weight here on Earth would snap our legs like twigs. This is one of the big reasons why we have not sent people to Mars yet.

Now let's say that a person has not been even moderately active for a long period of time and has gained weight. They have two strikes against them because their bones, tendons, ligaments, and cartilage have all weakened and their weight has increased.

If we place this person on an exercise program designed to develop base, we will do joint damage and increase the probability of bone, tendon, and ligament damage. We must put these people on a pre-base program just to condition their bodies so they can sustain exercise. This can be as simple as walking or just getting up and around more often. It may mean spinning below aerobic threshold for from weeks to months just to condition the body to handle aerobic development.

Biochemical Changes Due To Aging

As we go through life, we also go through a number of hormonal changes, which affect our body chemistry.

I have learned that sometime between 40 and 45 years of age, most men go through a chemical change similar to women's menopause. Some do it earlier and some do it later. After going through this change, our bodies atrophy to a lower level, atrophy faster, and require more work to maintain the same fitness level.

At this point, it becomes more important for us to maintain a minimum fitness level to prevent the problems faced by the people who would need pre-base conditioning. It also means that when an older person has to develop base to begin training, he will have to do more miles. I have found that, at 54, I need about 2,000 more base miles before doing anaerobic work than I did just ten years ago. (I went through this change at 42.)

The older we get beyond this point, the more base miles a person will need to begin anaerobic training for a new sport or when coming back in a sport. We have to take more time and come back more slowly. The absolute worst part is that we atrophy to a much lower level.



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Part III • Chapter Two

Weekly Training

Weekly Training

"Your body can only do what you train it to do."

My concept of training is based on how the body functions in relation to rest and exercise. It is advantageous to understand this at the molecular level but I am not going to give you a four-year college education in biochemistry or exercise physiology here in this book. But I will teach you basics about training.

Training Effect

The principle of training effect is the basis to all training programs, which are based on science. This principle states that when a muscle cell is subjected to physical exertion, molecular damage will occur and the cell is programmed to rebuild the cell to a slightly higher level so that, when the cell is subjected to the same workload, the cell will be damaged less.

Remember that fitness development takes time because you are changing the body a few molecules at a time. It takes a lot of little bits to make a big change.

You must understand that it takes time for the body to rebuild the cell from such damage. The amount of time required to rebuild from such damage is determined by the metabolic fitness level of the cell, the amount of damage done to the cell, the fitness level of the cardiovascular and cardio respiratory systems, how much your body is being taxed by other molecular activities such as illness, injury, growth, and pregnancy, and the fitness level for the

rest of your body. If the cell is damaged again before it finishes rebuilding, its programming will cause it to raise the level to which it will stop rebuilding but it is now behind on rebuilding.

After the cell has finished rebuilding, it will maintain that molecular structure for 24 to 36 hours while waiting for the activity to occur again at the same intensity. If the activity does not occur again at the same intensity within 24 to 36 hours of the time the cell has finished rebuilding, then the cell begins to tear itself down. We call this atrophy.

The body does this because maintaining a higher molecular structure requires more energy and the body doesn't want to use more energy than is really necessary. This is a survival mechanism from when we lived in caves and did not have ready access to food like we do today.

The Standard Program

The standard program being used today by most of the best coaches and exercise physiologists is based on the above principle and incorporates what we call rest cycles. Rest cycles were developed because we realize that it takes time for the body to rebuild itself and they give the body more time to rebuild.

The standard program is as follows:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100%	10-20%	90%	60-80%	90%	60-80%	10-20%
Race	Easy	Speed	Endurance	Intervals	Moderate	Easy

The way the system works is pretty simple. On Sunday you are supposed to workout 100% of what you are capable of doing for the day. In other words, you should go home so trashed that you fall on the couch and wait to die.

On Monday and Saturday, you are supposed to workout 10 to 20% of what you could which means that you should warm-up and go home. The 90% on Tuesdays and Thursdays means that you should go home feeling like you could do another 10 to 20 miles before you get trashed. You should have something left at the end of your training day. The 60 to 80% for Wednesday and Friday should be a moderate workout.

On Sunday, race day, you should work everything as far as fitness characteristics such as speed, acceleration, recovery, endurance, and power. This should be for both flats and hills but you can alternate between flats and hills from one week to the next. On Tuesday, you are supposed to work on acceleration and speed, mostly on the flats. On Wednesday, you are supposed to work on endurance. Thursday is supposed to be the day you work on intervals and power work plus hills.

With this program, you are supposed to work on everything two days per week, Sunday and one other day. Monday, Friday, and Saturday are obviously supposed to be rest and recovery days but we are also told that Wednesday is a rest day.

It is understood that you are not supposed to workout a group of muscles with an "intense" workout two days in a row. The experts don't consider endurance to be intensity work because you are not doing anaerobic work. This is why they consider Wednesday a rest day.

I had trouble with the idea that endurance work is not "intense" work simply because you are functioning aerobically. If you take this to the cellular level, it is clearly wrong. Endurance does a lot of molecular damage to the cells that takes time to recover from which means that, with this program, you are working your legs hard three days in a row, Tuesday, Wednesday, and Thursday.

If you believe that endurance work is not intense at the molecular and cellular level, go out and do 200 miles tomorrow and then try to do speed work on the next day. You won't be able to do the speed work because of the molecular damage the cells have not recovered from.

Therefore, endurance work must be considered an intense workout. This led me to use my exercise physiology and experience in sports to redesign the system. I came up with the following program and it really works.

The Cantrell Training Program

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100%	10-20%	90%	40-50%	90%	40-50%	10-20%
Race	Easy	Speed Endurance	Moderate	Intervals Endurance	Moderate	Easy

Since aerobic work does do cellular damage that takes time to repair, the endurance has to be combined with the other workouts so that you only work the leg muscles hard three days per week.

Based on my studies and experience, I hypothesized that anaerobic work also causes aerobic development and can contribute to it. This was proved to be true by the end of the 1980's. Therefore, your anaerobic workout can be used as part of your aerobic workout.

With my system, you get to work on developing your endurance three days per week. You also get four real rest days to allow your body to properly rebuild before the next workout or race.

Next, I had to categorize the different forms of training such as speed work and intervals as to how fresh your body has to be in order to get the maximum benefit from your workout. I listed them as below with the

workout at the top requiring the maximum amount of freshness in order to be able to do the workout properly.

- 📌 Acceleration
- 📌 Speed Work
- 📌 Power Work
- 📌 Interval Training
- 📌 Endurance

Daily Program

Sunday

Warm-up, race aggressively, spin your legs out, finish riding your miles for the day focusing on flats if your race was hilly or on hills if your race was flat. Warm down and go home. You should be trashed by the end of the day. The miles depend on your fitness level.

Monday and Saturday

Warm-up and go home. A great day to work on bike riding discipline. See my section on Riding Discipline. 10 to 20 miles regardless of how many miles you ride on Sunday. This should be a flat ride.

Tuesday

Warm-up, acceleration work, speed work, spin your legs out, endurance, warm down. The miles should be about 50% to 60% of Sunday's miles. If your miles for this day are less than 40, then only do flats. If more than 40, thrown in some hill sprints and accelerations after spinning your legs out. You can reverse the hills and flats if you have over 40 miles and feel you need to work more on hill speed and acceleration.

Wednesday and Friday

Easy to moderate depending on how recovered you feel from the weeks riding after you warm-up. Spin in a low gear at an easy to moderate pace.

Miles should be about 30 to 40% of Sunday's miles. This ride should be on flat ground to rolling hills.

Thursday

Warm-up, interval training, spin your legs out, power efforts mixed in with endurance workout, warm down. The miles should be about 70% to 90% of Sunday's miles. Work mostly on hills. If these miles are over 45, you should be able to do some flat jams and intervals during the endurance part of your ride.

Miles Chart

Based on 100 miles for Sunday

Adjust the table based on the number of miles you ride on Sunday

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100	10-20	50-60	30-40	70-90	30-40	10-20
Race	Easy	Speed Endurance	Moderate	Intervals Endurance	Moderate	Easy

On this program, riders improve very quickly. I never had any training related injuries, which is very unusual. Notice that this program focuses on **quality miles** instead of **quantity miles**.

Now, how do you make this program work for you? The first thing that a coach must do before he can begin coaching an athlete effectively, is to determine the athlete's fitness level. What I want to know about an athlete is how far do you normally ride on your longest day. This gives me an idea of what your endurance is.

Then I want to know your top end speed, do you do acceleration work and how, and do you do intervals and how. Your weekly mileage only tells me whether or not you are over training and how much. Your average speed on

a ride means very little to me. The only race you can win with average speed is a time trial.

For simplicity, lets say you ride 50 miles on your longest day. With such lacking endurance, you probably have a max speed of about 27 mph, you don't do acceleration work, and you don't do intervals.

The following table will show the proper structure of your training week:

Miles Chart

For a Rider Who Rides 50 Miles on Sunday

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
50	10-20	25-30	15-20	35-45	15-20	10-20
Race	Easy	Speed Endurance	Moderate	Intervals Endurance	Moderate	Easy

When you increase your mileage on a weekly basis, figure the total increase in the mileage for the week to be about 3% to 5% of your total weekly mileage.

If your weekly mileage is only 100 miles, then you only increase your mileage for that week by about 3 to 5 miles. Then you place that mileage where you feel you need it most. You may want to increase your endurance first so you add 5 miles to your Sunday. Or you may want to keep you schedule balanced within the guidelines I show, so you add 3 miles to Thursday and 2 miles to Tuesday.

Try to keep the percentages shown reasonably close. This means that you may increase Sunday's ride one week, Tuesday and Thursday a week or two later, and Wednesday and Friday after that.

Flex For Stage Racing

Stage racing is, by its very nature, overtraining. It also disrupts the training schedule. How do you adapt the schedule to a weekend with a stage race? I will give you examples for a two-day stage race and a five-day stage race.

The key to flexing this schedule for special events is to keep the last two days before the race the same as when you only have a one day race for proper recovery from your training and racing, and to allow enough time after the event for full recovery from it and then return to your schedule as soon as possible.

Below is the week before the stage race and the week after it.

Two-Day Stage Race

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100	10-20	50-60	30-40	30-40	10-20	Race
Race	Easy	Speed Endurance	Moderate	Moderate	Easy	Race

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Race	10-20	30-40	30-40	70-90	30-40	10-20
Race	Easy	Speed Endurance	Moderate	Intervals Endurance	Moderate	Easy

The week before the stage race, I backed Friday and Saturday up one-day eliminating Thursday's program. Its intensity will be replaced by Saturday's race. **DON'T EVER TRY TO MAKE UP ANY MILEAGE MISSED!**

The week following the stage race, I shortened Tuesday's workout to allow more time for rest.

If your legs are still tired following your warm-up on Tuesday, just spin for a while and go home. Let your body tell you when to back off or train and listen to it. Notice that you will return to your schedule on either Tuesday or Wednesday depending on how your legs have recovered by Tuesday.

Five-Day Stage Race

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
100	10-20	10-20	Race	Race	Race	Race
Race	Easy	Easy	Race	Race	Race	Race

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Race	10-20	10-20	30-40	70-90	30-40	10-20
Race	Easy	Easy	Moderate	Intervals Endurance	Moderate	Easy

Notice that I gave you two easy days for maximum recovery before the race by moving Saturday all of the way back to Tuesday and replacing Tuesday's workout with Saturday's workout.

After the race, you will need extra time to recover so I gave you an extra Monday and you will return to your schedule on Wednesday.

Workouts

How do you do those different types of workouts? I will show you examples of how to do each type of training program except for acceleration and speed work which I covered in the chapter on sprinting.

Except to say this about speed: It is one of the most significant tools you can have in racing and is the most ignored. Most people don't do speed work. If you don't use speed on them, they'll use it on you.

Think about this; in every race, the winner is the rider who covers a given distance or course the **fastest**. Going faster is having more speed; I don't care if it is a 1,000-meter match sprint or the RAAM. The winner is the fastest rider.

Boyer proved this when he won the RAAM by doing far less endurance work and being faster than the riders he beat. In the 50+ years I have been on this planet, I have never seen a race where the winner was the last person to drop dead which would be a race built entirely around endurance. All racing is based on speed so do your speed work.

Speed is the single most lethal weapon used by the pros. Look, it is just common sense that, if you can only do 30 miles per hour and I take the speed up to 31 miles per hour, your legs are going to break and your butt is going to slam through the back door like a cannon ball.

DO YOUR SPEED WORK!!!!

Interval Training

The concept behind interval training is to tire your body with anaerobic efforts and then force your body to continue working hard to increase your ability to recover from an effort. A good program I learned a long time ago from John Vande Velde and has worked for years is a very simple program.

The program has three sets of three efforts separated by rest periods. There will be a warm-up and warm down. You start with a 15-minute warm up that should have several light jumps in the last 5 minutes. Then you will do three 30 second efforts separated by two 30 second rest periods spinning in a low gear to spin your legs out, with each set of three efforts separated by a 5-minute rest.

Here's how to do them:

First, warm-up then:

- 🔗 **Ride hard for 30 seconds;**
- 🔗 Low gear and spin for 30 seconds;
- 🔗 **Ride hard for 30 seconds;**
- 🔗 Spin for 30 seconds;
- 🔗 **Ride hard for 30 seconds.**

Spin for 5 MINUTES

- 🔗 **Ride hard for 30 seconds;**
- 🔗 Low gear and spin for 30 seconds;
- 🔗 **Ride hard for 30 seconds;**
- 🔗 Spin for 30 seconds;
- 🔗 **Ride hard for 30 seconds.**

Spin for 5 MINUTES

- 🔗 **Ride hard for 30 seconds;**
- 🔗 Low gear and spin for 30 seconds;
- 🔗 **Ride hard for 30 seconds;**
- 🔗 Spin for 30 seconds;
- 🔗 Ride hard for 30 seconds.

Warm down.

Power Work

Power work is doing a sustained effort over a distance of one or more miles. You may jam for anywhere from a few miles to tens of miles depending on what you want to achieve. A great way to work on power is to solo during a

race when everyone is still fresh and riding hard. There is nothing that will give you a better workout for power than trying to out run a hot, sweaty pack breathing down your neck. It really keeps you on top of your pedals and is great for improving your time trialing.

Endurance

Endurance work is really nothing more than aerobic work. Aerobic work is simply nothing more than riding for 20 minutes or more. The longer you continue your exercise, the more aerobic work or development you are doing.

As I said before, there can be some cumulative aerobic conditioning from two rides but (1) the longer the time between the two workouts, the less the cumulative conditioning and (2) if the time between the two rides exceeds 12 hours, there is no cumulative effect. This is why weekly miles mean very little to me and daily miles are much more important.

Attacking

I feel it is important to give some special attention to attacking. The faster you accelerate away from the peleton, the more likely you are to successfully escape.

When practicing or training to improve your attacks, always explode into your pedals as if it is the last 50-meters of the race. Stand up, use your entire body, and push and pull on the pedals at the same time. The greater the explosive effort, the faster your muscles will develop an explosive attack which can be a very powerful weapon in a race, especially in a flat race.

Watch the best pros when they attack in a Criterium. They stand up, churn the pedals for two or three strokes, and then fly away from the peleton with amazing speed. Your body can only do that if you train it to do that.

Climbing

Over the last 35+ years I have heard many different arguments about climbing style or technique. Some people claim that you should remain seated while climbing and some claim that you should stand up.

They are both right and they are both wrong.

Watch the best climbers. They ride in and out of the saddle. There is a time and reason for both. When you are sitting down, your legs travel through a certain range of motion. You are using certain muscle cells, muscles, and groups of muscles. When you stand up, you change your range of motion and, therefore, you bring different muscle cells into the action.

Have you noticed that when your legs get tired while sitting down and you stand up for a while how your legs feel a little better when you sit down? That is because you let some cells rest while working others. It increases your total performance to alternate between muscle groups.

Learn and train your muscles to increase your climbing speed by alternating muscle groups. Also, practice attacking on climbs while standing and sitting. Your body can only do what it is trained to do. If you don't work the muscles, they don't develop.

Training Races

Racing is the best form of training because the competition causes the adrenaline to flow and you will push yourself harder. Therefore, it is really good to use a training race as part of your workout on Tuesdays and Thursdays.

For Tuesdays, you should use a flat Criterium or short road race for speed and acceleration. You should do a lot of attacking with explosive jumps. After the training race, spin your legs out and finish your miles.

For Thursdays, you should use a short, hilly road race or time trial for power work. Try to go on long breaks with heavy attacking.

Remember that a training race is for training purposes:

The winner of a training race is not the first person to cross the line but the person who got the best workout.

Race Aggressively

If you stand and watch an amateur race with one or more good pros, you will hear them make several comments about riders. If they see a young person attacking his brains out, even if he gets dropped because of his attacking, the pros will say that that rider has potential.

Even without understanding the physiology about the principle of training effect, they have learned that a rider must race aggressively to develop the speed and strength to race at the professional level. If they see another rider sitting in for the entire race to save it for the sprint, they will say that that rider has no promise for the same reason.

The most common mistake I have seen riders make over the last 35+ years has been to start out racing aggressively and improving rapidly and then some friends tell him that he would do better if he would race "smart." By racing smart, they mean to stop racing so aggressively to save something for the finish. I have seen hundreds of racers follow this advice.

When they decrease the workload on their bodies, their bodies' atrophy, they stop improving and start slowing down, and their potential goes to

zero. Fitness development is first. Learn to develop your tactics and strategies around your aggressive racing so that you will improve both physically and mentally.

This is particularly important for riders who are moving up through the categories with hopes of a pro career. When you go from one category to another, you are moving from a group of riders at one fitness level to a group of riders at a higher fitness level.

The riders who continue to race aggressively and develop physically until they can attack from start to finish and still win and place do very well when they move up to the next category. Riders who have to sit in to place or win and move up, struggle at the back, get dropped, and most quit racing or get themselves moved back down.

If you cannot attack start to finish and still win and place, then you are not ready to move up and need to keep attacking until you are fit enough to attack start to finish and still win and place. This is especially important when going from cat 3 to cat 2 because you are not actually going from racing against cat 3's to racing against cat 2's.

Remember that, in most races, cat 2's ride with cat 1's and pros. So, you are actually going from cat 3 to pro. I strongly suggest that you be able to race aggressively from start to finish and win and place before you make that move. It will save you a lot of anguish.

Domestics who are hoping to improve their career potential should use the same principle. Don't let it get you down when all you get to do is ride for someone else to win or place. Take advantage of this to improve yourself to where you can be a team leader. Use your job as a domestic as training by riding as hard and aggressively as you can to make yourself as strong and fast as possible. You will only get so strong and fast before someone will notice you.

In my farm program, I used this principle with a lot of success. The new riders coming into a category were domestics for the stronger riders. This increased the chances of the stronger riders winning by having the new riders do as much work as possible. This also caused my new riders to improve faster because they got the best possible workout.

Some domestics actually passed their team leaders in fitness and found their former team leaders riding for them. It works.

Using Races For Training

There is an obsolete concept still being taught in cycling today. A lot of people are still being taught to try finishing the race to get miles instead of hammering themselves out the back to increase their speed, power, acceleration, and recovery.

Because of the adrenaline dump you get from competition, you are going to be able to push yourself harder in a race than on any training ride and get a better quality workout. You can do miles any time. Therefore, you should use your race to get the best quality workout you can instead of a quantity workout.

The way I worked it with my farm program, was that I had them race hard until either they got dropped or the race ended. If they got dropped and pulled from the race, I had them go spin their legs out while waiting for the race to end. Then I got everyone together for a brief race review, gave him or her their training instructions, and sent them out to finish their miles. You can always do more miles after the race but not the same quality. So do quality during the race.

Let me give you a couple of examples.

When I was at Colorado Springs, consulting with the coaching staff on their new Olympic Development Program, I met three riders from Texas who had heard about me and wanted to join my program. I told them that the policy for my program was that the doors were open to anyone who would join the program, do what I told them, and wanted the coaching. They moved to Los Angeles and started attending my program. I warned them about the racing being fast and told them that they had to race aggressively from start to finish.

At that time, the racing was so much faster in LA than in Texas, that none of them finished the first 10 miles in a 50-mile Criterium. At least one or two of them had been Texas State Champ's. It took them three months of riding aggressively before they finished their first race. Two months after that, they won their first race against riders they had not been able to stay with just five months earlier. It works.

The second example was Dave Lateirri. This also started at the same training camp in Colorado Springs. Following a rider meeting, the eight times National Track Champion, was publicly humiliated and dismissed in front of all of the other riders. It was very unprofessional of the USCF coaches to handle a firing in this manner. It should have been done in private. Riders are people and deserve to be treated as such.

The problem was that Dave had been racing out of the training camp for years and had not only not improved for two or three years, but had fallen off in performance. After everyone left, Dave came to me for help because he didn't want to go out of cycling this way. Who would? I gave him the same instructions as I did the riders from Texas, told him that he wouldn't get special treatment, that I could help him, and he moved to Los Angeles.

I put him on the same program as above and the next year, Dave achieved over 80 track and road wins and placings. He later thanked me for what he called the two best years of road racing in his career and for making it

possible for him to retire winning. I know for a fact that he enjoyed beating the national road team those two years. It works.

Myth Buster

There is a common myth in cycling that your endurance increases as your weekly mileage increases. This is not true. Endurance is aerobic development. Aerobic development is determined by continuous exercise beyond 20 minutes of work. The longer that workout is, the more you are developing your endurance.

ENDURANCE WORK IS NOT CUMULATIVE FROM DAY TO DAY.

You can have continued aerobic development from one ride to the next as long as the second ride starts a maximum of 12 hours after the first ride ends. Even with this, the greater the time between the two workouts, the less the cumulative aerobic development takes place.

For example, riding 50 miles in the morning and 50 miles in the evening does not provide the same aerobic development as riding 100 miles in one ride. As a matter of fact, if there is 10 to 12 hours between the two rides, the combined aerobic effect of the two rides is only equivalent to about a 60 to 70 mile ride.

If there is only about an hour or less between the two rides, its aerobic equivalent is at about 95 to 100 miles. If there is more than 12 hours between the two rides, there is no cumulative aerobic development. Your endurance is determined totally by how far you ride in **ONE** ride. Miles per week mean almost nothing to me. I want to know how many miles you ride in one day. That and only that tells me what your endurance fitness level is. In other words, you will develop more endurance by riding 100 miles in one day than if you ride 75 miles two or more days in a row.

Quality is Better Than Quantity

Most riders think that doing more miles per week is better. This is not true. Doing better miles per week is better. I have several good examples of this.

John Vande Velde told me about a racer in Florida who didn't have the money to make the circuit (this was a few millennia ago in the late 60's when I was racing and we couldn't have sponsorships and prizes couldn't be worth more than \$50.) He decided to use his training to make the circuit by riding his bike from race to race. He got the racing calendars for the East Coast and Mid West and put together a timetable where he would be at a race every weekend.

John said that by the time the guy reached Chicago, he could do 23 miles per hour all day long but couldn't do 24 miles per hour. He wasted an entire season because he thought more miles were better miles.

The second example was my own racing in New Mexico. My tutors, John Vande Velde, Tom Garrity, and Dr Rypka, plus my training in the sports sciences taught me to focus on quality instead of quantity. When I became the best rider in New Mexico in 1969, I was only training 200 to 250 miles per week. All of my competitors were riding at least 300 to 400 miles per week. By the spring of 1970, there wasn't a rider who could keep me in sight much less stay with me.

That summer, I headed to Chicago to race. After I got there, my arrangements fell through; I ended up working day jobs to get home, and not being able to train. We didn't have sponsorship and couldn't race for prizes worth more in retail value than \$50 back then. The only riding I was able to do were the races I rode on Sunday.

But while I was there, something very interesting happened which would stir things up back home.

From what I was told, one of the two best racers still in New Mexico couldn't afford to travel to New York for National's and, with our state qualifying three riders, he was almost certain to qualify. They had a meeting to see if the cycling community could raise the money in donations to send him to nationals. They had the commitments to finance his trip when someone (I still don't know who) stood up and is alleged to have said, "Why are we spending money to send our second best to National's when the best rider in the state is already back there?" (They didn't know about my problems.)

They asked the state rep if they could not run states so I could retain my title (I won it the year before) and represent the state at National's. The rep contacted the ABL of A president, Al Toefield, who contacted the chairman, Karl Wetberg, who called a board meeting, which said that every licensed racer had to be contacted and, if **ONE** racer wished to contest the title, the race had to be run.

The first thing I heard about this was when some of the Chicago riders told me that they had heard that I had been awarded an official honorary state title by the ABL of A. Later, I got a letter from the rep confirming it.

When I got back to New Mexico, all of the racers were furious at me. According to racer, Stephen Griego, they had all been forced to publicly admit that they could not beat me because, to say they wanted to contend for the title, meant that they thought they could beat me. They were humiliated and very mad at me about it.

They all went out, bought books written by pros, and started putting in from 400 to 600 miles per week. They literally confronted me and swore that they would pound me the next year.

The trouble was that they were just grinding away one hundred mile team time trials. And they did it all fall and winter. They were developing power and endurance, but nothing else.

Between the end of that summer and the first race of the next spring, I never did over 250 miles in one week. Mean while, I was doing quality, developing speed, acceleration, recovery, endurance, and power.

By the next spring, they could grind away at 24 to 25 miles per hour until Hell froze over. Not one of them could do 35 miles per hour and I could. I murdered them in my last two races before retiring from serious racing.

It's just like I said before, if you can only do 30 and I take it to 31, your legs are going to break and your butt is going to slam through the back door like a canon ball. If they had trained right, they could have beaten me. I wasn't exactly Eddy Merckx, you know.

The only reason they couldn't beat me is because they didn't know how to train right. **DO QUALITY.**

- ✚ **Always remember that it isn't how many miles you ride but how you ride your miles.**
- ✚ **Quality comes before quantity if you want a quality performance.**
- ✚ **You can't beat somebody you can't stay with.**
- ✚ **If you don't train right, you chase those who do.**

Pro Books

A very common problem I have noticed over the years is people buying a book written by a pro, which only has the training program he is presently using. The amateurs try to train using his same program and get themselves in trouble.

They fail to realize that the pro didn't get to where he is by training with that program. You don't walk up to a ladder and try to step on the top rung. You have to step on all of the other rungs first. Training is the same way. If you can't toe the line and trade blows one on one with that pro without losing ground, you should not even consider training anywhere like that pro.

Besides, even if you were evenly matched with the pro, you wouldn't have the same strengths and weaknesses. You should have your own custom training program designed to meet your needs and not the needs of someone else. That is why I am trying to teach you the basics about putting your own program together.

I strongly encourage any pro who writes a book to dust off his old training logs going back to when he started racing and including training programs from at least five or six different racing levels. That book would be worth buying.



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Part III • Chapter Three

Off-Season Training

Off-Season Training

My off-season training program is designed to meet the needs of the athlete and solve the problems caused by other training programs.

For example, if you use a fixed gear and spin all through the off-season, your muscles, bones, and tendons tend to atrophy from a lack of strength stressing. At the beginning of the next season, you have to spend weeks rebuilding that strength and will only build up to the level of strength you had at the end of the previous season.

A common medical problem caused by doing nothing but fixed gear work during the off season because of the atrophy of tendons is tendonitis of the knees caused by jumping on a big gear after not having used one all off season. I solve this problem while continuing to develop your strength through the off season and making sure that you don't over train or come up too soon in the year.

Let me give you a word of caution here. The first time you use my off season program, you will think you are up too early when you get to January because you will be flying. Every racer who has used my off-season program has felt this way. Yet I have never brought a rider up too soon and had him or her burn out in April or May the way riders do if they are brought up too soon.

What you will be experiencing is that my program continues to develop your base fitness so much more than other programs that your base fitness will have improved so much that you will think you are up too soon. You will find

that you are wrong because you will just be much more fit or at a higher base fitness level.

End-of-Season Rest Cycle

Even with my program and all the rest you get, you will be overtrained by the end of the racing season. As a matter of fact, you will be so overtrained that you will be able to take off a full two weeks from training, spin your legs out for a few days, and be flying faster than all season.

This is in spite of the fact that I have much more rest built into my program than any other program.

Therefore, I always had my riders take off the last two full weeks in October with absolutely no structured training of any kind whether on the bike or off the bike. I didn't even permit them to ride their bikes during this period of time. They hated it until it was over and they got to spin their legs out and found that their speed and strength had increased. It took them one or two off seasons to get reasonably used to it and to accept it.

This rest cycle, as are all the others, was not just meant to give the body rest but also to give the mind rest. It is as important to rest the mind as the body because mental burnout prevents an athlete from training properly especially during the off-season when weather can discourage even some of the best from riding.

You can't just deal with the physiology of the athlete; you must also deal with the psychology of the athlete. This means that you have to starve the cyclist just enough mentally that they stay hungry for the sport and training. You have to be careful not to let the athlete get enough racing and training to become satisfied. They must always be wanting to go do it.

Weekly Program

My weekly training program uses the same distance or endurance formula as the on season program. When my riders came back from their two weeks off the bike at the end of October, I always had them drop their miles to half what they had been doing just before the two weeks of rest. Then I would increase their miles per week at a weekly rate of 3% to 5%. I added these miles on different days each time so that I kept their program balanced with my formula.

For example, I would add the increase in miles to Sunday one week, split the increase in miles and add them to Tuesday and Thursday the next week, and then split the miles and add them to the easy to moderate days the following week. I always made sure that their week remained balanced as my formula requires.

By doing this, I always had them doing more miles by the end of the off-season than they had been doing at the end of the previous racing season. This is one of the main reasons they always felt like they were up in January. They really just had a better base without overtraining.

I had my riders spin in a low gear for Monday, Wednesday, Friday, and Saturday. If you want to do fixed gear training, you do it on these days. I never had my riders do fixed gear riding because I was taught a better system on the road bike by Tom Garrity.

You see most cyclists can't afford a track bike for training purposes. If you teach the riders to simply discipline themselves to always have pressure on the pedals when they are riding even when braking for a stop sign or street light, then it will have the same physical effect, plus it also disciplines the subconscious mind which fixed gear training doesn't do.

I had my riders break their Sunday, Tuesday, and Thursday rides into four parts or quarters:

- ✚ They spent the first 25% of the ride spinning slowly in a low gear for warm-up.
- ✚ The second 25% of the ride was spent spinning in a low gear at a moderate pace for base work.
- ✚ The third 25% was spent **PLAYING** in any gear they wanted.
- ✚ The fourth 25% was spent spinning in a low gear for warm down.

This gave the riders their low gear aerobic base work but also provided them with just enough quality work to, not only prevent atrophy, but also to keep them developing their speed, power, acceleration, and recovery.

NOTE, this was always as play and never as structured work so that they (1) didn't get burned out mentally and (2) didn't over train. By limiting their quality work to 25%, which is much less than they do during the racing season, it kept them from overtraining. I never had riders develop tendonitis at the beginning of the next season from jumping on a big gear. Their legs were always conditioned for racing without overtraining.

For example, if you rode 100 miles on Sunday, you did 25 miles in a low gear warming up, the next 25 miles in a low gear at moderate speed, the third 25 miles playing in any gear you wanted, and the last 25 miles in a low gear warming down. You will find that the 25 miles of play helps break up the training ride and keep it fun and enjoyable. This keeps your riders in love with the sport.

I also had my riders do flat riding on Tuesday and hills on Thursday. This along with my monthly program for Sundays made sure that they got the right balance between flats and hills. This is really great for GC riders.

Monthly Program

I had my riders vary the Sunday rides on a monthly basis. First, every other Sunday was a flat ride and every other Sunday was a mountain ride. This meant that for every two weeks, my riders got three days of quality riding in the mountains and three days of quality riding in the flats. It kept their training balanced.

Next, I set up a variety of rides based on a monthly basis. Once every month, I had my riders do a 10-mile (16 kilometer) time trial beginning in November and ending in January. The first time trial in November was an individual time trial. I used his or her times from this time trial to pare everyone based on time for a two-rider team time trial in December. This meant that Seniors, Women, Juniors, and Masters would often be on the same teams because my only Criterium for matching them was time. Next, I used the times from the two-rider team time trial to pair teams together for a four-rider team time trial in January.

This program really improved their time trailing and team time trialing, gave them some power work, and, by keeping the time trials short, it kept them from overtraining. It was great mentally because they loved it and it helped break up the off-season. They would warm-up before the time trial and finish their miles after the time trial. The time trial would be part of their 25% intensity.

Also, once every month, I had them do a special training Criterium we called the Cantrell Training Criterium. This was always kept short (25 miles or 40 kilometers) but intense and on a flat course. The course can be from about half a mile (one kilometer) to one mile (two kilometers.)

I have found that, in order to maximize the quality of a workout in a Criterium, you need to remove any concern about being dropped, which removes any inhibitions for attacking and racing hard. To do this, I simply

designed a Criterium format where laps completed mean nothing. The event is based entirely on points earned from attacking, going on break, staying on break, gaining ground on break, and chasing. This permits riders to ride hard enough to blow themselves out of the peleton, spin their legs out, and jump back in to race for more points. Your riders will get dropped until they develop the fitness level to race hard start to finish and still stay in.

This works great for both the stronger and weaker riders because the weaker riders will rest after getting blown out and then return to push the stronger riders even harder when the stronger riders are tired. Both riders get a better workout. This race is for fun and fitness development so always remember that the rider who really wins a training race is the one who gets the best workout. Everyone who has done this training race has said that it was the best workout they ever had because all inhibitions were removed and they went crazy with the attacking.

You can be flexible with the points system as long as it is fair. Remember this is for fun and fitness. I suggest you start with a points system as follows. (1) Every rider gets one point for every attack and chase effort or pull on the front, (2) every racer gets one point for every 5 seconds they gained on the peleton before being caught, and (3) every rider gets one additional point for every lap they stayed off the front. With this system, I had cat 3 Seniors, Masters, Juniors, and Women beat Senior cat 1's. It doesn't matter how many miles you do. It matters how hard you race.

The riders would warm-up before this training ride (it was so intense and short they better) and then spun their legs out after the race and finished their miles. By keeping this race so short and only running it once per month, they got great quality work, fast pack riding, had great fun, and didn't overtrain during the off season. This race was always their quality work for the day.

I did my best to make their off season as much fun as possible. These two events gave them something to look forward to twice each month during the off-season. It is crucial that they keep loving the sport.

Two Rest Cycles

I also threw in two three day rest cycles to make sure that none of my riders overtrained during the off season, to give them a little extra mental rest, and to starve their minds so that they always wanted more.

Being in the US, we have two holidays in November and December, which were great for these rest cycles. These are Thanksgiving and Christmas when few people want to ride anyway. If you are in a different country, which has different holidays in those two months, I suggest that you use those days for your rest. If not, then simply take off three days toward the end of each month.

I forbid my riders to even touch their bikes during these two 3-day rests. These rest cycles always brought them back fresher and more ready to ride. They are very important.

Pre Season Rest Cycle

For the last two weeks in January, I threw in a two-week rest cycle to make sure they were not overtrained going into the pre season and to make them want to ride even more. Since I had been making sure that they didn't overtrain during the off season, I only needed to cut their miles in half for these two weeks to get them recovered from any overtraining because it would be minimal.

The way I worked this was to decrease their miles per day by half for the two weeks. At the end of the two weeks, I began increasing their mileage by 3% to 5% per week for the rest of the season or until they reached the

miles I felt they should be doing without overtraining. By the end of the season they were doing more miles than they had been at the end of the off-season. I always kept increasing their aerobic base from one season to the next so they would always be more fit, faster, and stronger. It works.

The balance of this program is why my riders were always more fit every six months. It is the proper combination of fitness development and rest to keep the bodybuilding to a higher fitness level.

Off Season Weight Training

My off-season program was designed to not include weight training because I know that most riders do not have a regular access to weight lifting equipment. Therefore, I designed the program so it would do the same thing and more without lifting weights.

If you decide you do want to lift weights with this program, then read my chapter on Weights. Be sure to do the workouts in the order shown. You do the weight training (it is quality work) on Tuesdays and Thursdays in place of the 25% play riding you do on those days. Do not lift weights on your easy to moderate days because you will overtrain. You do not want to replace your Sunday quality work with weight training.

Cross Training

Cross training is designed as much for mental rest during the off-season by getting you away from the sport of choice as it is for physical development. It is also designed to give you a little more balanced fitness development by working muscles you don't normally work with your sport of choice. With cycling, if you race right with a lot of stand-up attacking, you should work almost all of your muscles.

If you want to do cross training during the off-season, then you need to do several things. First chose a variety of activities which compliment cycling. These will include activities, which involve running or cross-country skiing. Cross-country skiing is the best because it works both the upper and lower body the way cycling does. If you do running activities such as soccer, you will also have to include swimming to keep your upper body fit.

A good sport I introduced to the national training camp and is still being used there for cross training is team handball which uses both the lower and upper bodies. You can also use basketball. Another activity, which can be included as PART of a good cross training program, is gymnastics. There are any number of activities, which can be used as part of a good cross training program such as martial arts and even ballet.

What you need to do is evaluate which parts of the body these activities work and how they work that part of the body. You want them to complement each other. For example, you might want to use soccer, which works mostly the lower body and gymnastics, which work mostly the upper body. If you are using an activity for a very intense or hard workout, then it needs to be done on Tuesday or Thursday. If it is just for fun and not very hard, you can do it on Monday, Wednesday, Friday, or Saturday.

I personally feel that you should not replace you Sunday ride with any activity. You really need it to keep developing your aerobic base, leg speed, and general cycling fitness.

Bad Weather Training

Most people live in areas where it is difficult or even impossible to train on the road regularly during the winter. There are a variety of ways to handle this. They all involve some form of cross training. In more rural areas, you can ride mountain bikes on back roads in the snow and mud. The sport of cyclocross was started for the reason of providing winter training for road

racing. Roller racing is another sport, which was started as a form of winter training for road and track racing.

Other options include using other sports, which use the legs a lot and, therefore, will condition the legs. You may have to use two or more sports to get the type of conditioning you want. If you can afford them, it is best to use rollers to help keep your legs loose on your easy to moderate days. This is because running tends to tighten your muscles up compared to cycling. Weight lifting followed by spinning is good but should also be complimented with something like running at least twice per week.

You can use running, ice-skating, cross-country skiing, soccer, basketball, and team handball. If you have access to an indoor pool, it is very good to do some swimming or water polo for upper body strength and fitness. Gymnastics is great for upper body strength and agility to improve your body coordination. Improving body coordination will help you ride through more crashes and roll better when you do crash. Martial arts are also good for fitness, upper body strength, and coordination.

Rowing is another sport, which is good for upper body strength and leg strength. It is very complimentary to cycling. There are a variety of different types of rowing ranging from kyaking to skulling. Kyaking doesn't use your legs as much as either cycling or skulling so you will also have to do some leg activity like running.

And you don't have to use sports. Dancing is great for fitness development if it is done frequently and long enough with enough intensity. Good examples are modern dance and ballet. Besides, they are indoor, provide a psychological break, and can be fun.

The two best ways I have found to increase your lung capacity during the off season are singing and swimming (especially under water.) I suggest that you not try singing under water. :-) Not good for the lungs. They tend to fill

up with water when you inhale. Singing in the shower or a church choir is great for improving your cardio respiratory fitness. The next time someone gets after you for singing in the shower, tell them you are training. :-)

The basic principle for developing a cross training program for a sport is to first study exactly what types of conditioning are required for the different parts of the body including the lungs and heart. Then you find other sports or activities, which provide the needed conditioning for one or more parts of the body until you have the entire body covered.

If the sports compliment each other well enough, you can get by with one or two activities. If not, then you may have to use three or more activities but remember that any intensity work must be done only on your intensity days. You may only be able to ride outdoors on the weekend. Once again, if you can afford them rollers are great to keep your leg muscles loose by spinning on easy to moderate days with no resistance against the rollers. They also help bring up your leg speed and improve your bike handling. Rollers are a very valuable tool for off-season training.

Hypothermia

It is important to understand a nasty little thing called hypothermia. This is a term which means that your body is losing heat fast enough to burn up stored body fuels and eventually cause illness or death.

Too many people think that hypothermia is only when your body temperature has dropped below a certain level. Actually there are different levels of hypothermia and it really begins when your body begins to lose heat quickly burning up stored body fuels.

If this condition continues, your body will begin to cool or drop in temperature until your body is too cool to function. That is when death results. If your body temperature drops below 75 degrees Fahrenheit for an

hour or more, you have a less than 10% chance of survival. You don't have to be in freezing temperatures to die from hypothermia. Most people don't know it but you can die in as warm a temperature as 55 degrees Fahrenheit with a light mist and a gentle breeze in as little as one hour if you are only wearing shorts and a light shirt.

This is also very important for training purposes because of the way hypothermia develops in the body. To keep you alive, the body has a survival mechanism built into it. When your body begins to lose heat too quickly, it decreases and can even stop blood flowing to your outer parts starting at the fingers and toes. Next, it decreases blood flow to the arms and legs. This is to stop the loss of valuable heat from those parts in order to keep your body and mind functioning longer. Even if you survive hypothermia, this process can regularly cause frostbite in your appendages resulting in their amputation.

There is an important lesson in this for training purposes. One of the most important parts of fitness development for cycling is the increase in the size and quantity of blood vessels in your arms and legs. If you don't keep your arms and legs properly covered when training so that they get cool or cold, then the body will decrease blood flow to those parts. This will cause two things. First, you won't be able to develop your cardiovascular system if the blood flow through those parts of your body is decreased.

Second, decreasing the blood flow decreases your muscles' ability to work and condition. Therefore, you should keep your body properly covered when training in bad weather or it will decrease or even prevent fitness development. Why go out in bad weather to train if it doesn't do you any good because you don't dress properly?

There are several other things you can do to decrease or prevent the effects of cooling the body. One is to eat plenty of food while riding. This puts more calories in the body, which provides more fuel and decreases the cooling of

the body. Another thing you can do is to ride shorter distances on really bad days or make calculated stops for food, warmth, and hot beverages. Riding in groups and having a support vehicle with hot drinks are also good helps.

You need to be aware of what is called wind chill. Physics tell us that, as you increase the speed of air, you decrease the temperature. Increasing the speed of air over your body decreases the temperature of your skin. This increases heat loss and increases the effect of hypothermia. You can get wind chill charts from many sporting goods stores. It is good to have one and use it to help you figure whether you should train outdoors or not. A lot of skiing and camping stores have them.

Another thing you need to be aware of is, if you breath too deeply in really cold air, it can damage or destroy lung tissue by freezing it. Not training, training easy to moderate, or wearing something over your mouth and nose can help prevent this from happening.

You also need to use common sense when training on courses where you can be injured. It does not make sense to risk serious injury for one day of training that could cause you to lose a month or more of training. Use your head when you train during the winter. It could save your butt. :-)



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Part III • Chapter Four

Annual Training

Annual Training

In this Chapter, I want to discuss design and purpose for your training program on a year round and long term basis.

Unfortunately, most racers never learn to train in a designed, structured, and organized manner for purpose. I have known riders who have been racing for 15 to 20 years and still don't have a purpose for the way they train on a weekly much less daily basis. In my program, I have a purpose for every thing my riders do in a week, on any day, and even each little thing they do within a day.

To establish a purpose, you must first establish your short and long term goals. For example, let's say that you have just started racing (Senior Men's road) and your overall goal or what you want from racing is to be a competitive weekend warrior at either the cat 3 or cat 2 level. So you set your short term or three-year goal at becoming a competitive cat 3 racer. Your long term or five year goal would be to become a competitive cat 2 racer. On my program, these are reasonable goals and easily achievable for most riders.

If you have been racing at least 3 to 5 years and have not achieved these goals, with few exceptions, you have been racing and training wrong. Women, Juniors, and Masters should achieve these same goals in their classes about one to two years sooner pending their starting fitness levels and restrictions placed on training by your job.

In the five years of coaching the Los Angeles Racing Team, I only had one Senior Men's rider who did not achieve the first goal in three years or less and he achieved it in four years. Almost all my Women, Juniors, and Masters met or exceeded their three year goals because they trained with purpose from day one.

Let me show you the difference between the normal programs used by most racers and the designed program used by my racers when I was coaching the Los Angeles Racing Team.

In any category, you have at least five or six different, easily recognizable fitness levels present. Starting from the bottom of a category and working your way to the top, you have in order (1) the riders who regularly get dropped by the peleton, (2) the riders who hang in on the peleton hoping to finish the race with the peleton, (3) the riders who hang in the back of the pack and regularly finish the race with the peleton and are capable of doing some work at the front, (4) the riders who have to sit in and save it for the finish to be able to place or win, (5) the riders who can work at the front, regularly place, and occasionally win, and (6) the riders who can race hard at the front and regularly win.

In most programs, riders are exceptional if they move upward through two or more of these fitness levels in one year. Most racers will spend one or more years in one of these fitness levels because of the way they train and race. Almost all of my riders moved through at least two to three of this fitness levels per on season and per off season or four to six levels per year. Most of my men who stayed with my program went from beginners to strong cat 1's and 2's within 3 to 5 years. Juniors within 1.5 to 2 years. Women and Masters within 2 to 3 years. They moved up even faster in Mountain Bike and Track Racing.

So, how do you achieve this kind of results? You start by looking at your program from an annual perspective. This means that you have to see the

entire program as it is run as one full year of training and racing with goals set for the end of each season. There are four basic parts to a normal annual racing calendar. You start the year with your pre season which is followed by your racing season, then you have your post season followed by your off season.

For example, in the southern United States, your normal pre season is from the middle of January to the end of February. The racing season will start about the end of February to the beginning of March. This racing season will normally go until the middle of October. The post season will be two weeks from the middle of October to the end of October. The off-season will run from November to the middle of January. Your annual weather patterns will cause these seasons to vary.

You must even have goals and a purpose for each of these seasons. For the pre season, your goal is to prepare yourself to begin racing. The primary goals for the racing season are to win certain events while improving throughout the entire season.

The post season is meant for your body and mind to recover from a hard racing season and to prepare your body for the off-season training program. The off-season is meant to increase your base or aerobic fitness level while at least maintaining anaerobic fitness.

I always improved the later. The off-season is actually where you can do the most work, IF your program is properly structured. My riders improved as much in 4 months of off-season as they did in 8 months of racing season because I had better control of their program.

Pre Season

The pre season is in two parts. For the first two weeks, you cut your miles in about half for your intensity days to permit your body and mind to recover from a good off-season of training. Everything else remains the same.

Starting in the third week and while at the half distances, you start doing your regular structured on season training program. This permits your body to adjust to on season training without overtraining and decreases the potential for training related injuries. After two weeks of this, you gradually begin increasing your miles as you did with your off season so that your body gradually increases in fitness and adjusts to the added miles while doing on season training.

Racing Season

You have already set your races as far as priority as I explained on the page titled "Your Racing Calendar." At this point, you begin riding races while continuing to make the necessary adjustments to your training program on a weekly basis as I have explained on numerous other pages. You should continue increasing your miles from the beginning of racing season until about the end of May or June depending on your performance and goals. Under special consideration will be increasing your miles for even longer into the season.

You want to increase your miles until you are training at least one and a half times more than your longest race for the year. (This is up to a point, which I will explain later.) In other words, if you normally race 50 to 65 miles, then you should be training at least 100 miles total on race day.

The reason for this is basic physiology. I told you how you increase your body's ability to do work within a given time period through aerobic

development by increasing the size and number of blood vessels, your heart size, and cell fitness levels.

If you normally train about 65 miles in one day (race day), then you will start to tire at about 30 to 40 miles in a race. But if you normally train about 100 miles in one day, then you will start to tire at about 60 to 70 miles in the race. It is only common sense that the rider who is least tired towards the end of a race is the one who is most likely to win the race. Now, remember that rate of fatigue is also effected by anaerobic development so your program has to be properly balanced both aerobically and anaerobically.

I had my cat 1's and 2's ride 100 to 150 miles on Sundays during the season. If we had been preparing to race in Europe, they would have trained 150 to 200 miles on Sundays. I have found that, when you reach the point where you are regularly training 150 to 200 miles one day per week, your body has a high enough aerobic fitness level to ride any distance raced including Paris-Brest-Paris and the RAAM. At that point, it only becomes a matter of how fast you can ride, tactics, and mental toughness.

By the end of the racing season, you want to have a much higher aerobic and anaerobic fitness level than at the beginning. This gives you the increased fitness development that moves riders up in fitness levels. Without this, you can spend years at one fitness level. Therefore, your training program must be structured to achieve this and that requires purpose and goals.

Post Season

The post season is very brief but very important. With as much rest as I use in my program for the racing season, you will still be overtrained enough by the end of the year to require two weeks off training for both your body and mind to recover.

This is very important especially if you live in an area that has really bad winters. Facing those really bad winters with a tired body and/or tired mind makes it much more difficult and you will not train right. The mental rest is just as important as the physical rest. No training for two weeks. No maybes.

Off Season

This is my favorite time to build my athletes. This is turning lumpy old clay in to beautiful pots time. This is when I can sculpture athletes out of nobodies. Your main focus has to be aerobic development but, if you do it right, you can still progress a lot anaerobically.

You do this by cutting your starting miles down at the beginning of the off-season to about half to two thirds of your miles at the end of the racing season. How much you decrease the miles is determined by how you were doing at the end of the racing season, your racing performance, and some other factors. Then you gradually increase your miles until you are well above the miles needed for your races by the end of the off-season. This provides maximum aerobic fitness development without overtraining or burning out.

There are also many other things a coach can do at this time of year like getting rid of bad riding habits, which waste energy and cause poor rider discipline.

I ran weekly skills clinics where I refined their paceline, pack riding, cornering, and other skills down to a fine science. I did the same work for my racers that coaches in other sports such as football and basketball do for their athletes.

I got and relished compliments from pros about how well even my cat 3's could ride in a pack. There were cases where pros were actually confused because they didn't know one of my cat 3's, thought he was an out of state pro who had just moved to the area, and were surprised to find out that he was just a very well trained cat 3.

My riders were good in a pack and I was very proud of them. I trained every rider as if he/she was going to go pro; knowing that most wouldn't but that they would be much, much better amateurs. It works.

I ran special clinics and drills for time trialing, climbing, sprinting, acceleration, and everything else I could think of to improve my riders in every way possible.

I lived by the rule that **your strengths are tools you use on your competition and your weaknesses are tools you give your competition to use on you.** I hated giving my competition so much as a millimeter. But I sure love taking everything I can get in a bike race.

Overview

From season to season and year to year, your miles should gradually increase to give you the desired fitness development. You don't want to do it too slow or too fast. If you have started doing what most cyclists do, which is just riding whatever distance the group decides to ride when they show up, then you will be limited by those rides.

That is just blundering through the year. It gets thousands of riders nowhere quickly every year. I want to thank those riders for continuing to do that because you made my riders and me look very good. Thank you.

It really helps to have one or more training partners who also want to train with purpose for maximum fitness development.

Having an entire team training this way is really great and makes it so very easy and fun. You will be amazed at how much faster you will develop every year when you learn to train with purpose than just blundering through the year. It works.



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Part III • Chapter Five

Measurements

Measurements

I see a lot of misunderstandings about what information is necessary for your training purposes. Before I address this topic, I want to make sure you know that I am not some ignorant old coach who is stuck in obsolete ways.

Therefore, I will list my credentials concerning this topic because this page will fly in the face of all you are being taught by the media and others. This is not for bragging but so that you know that I know what I am talking about and that my decisions and perspective on this matter are based on education and knowledge.

In college, I studied chemistry, biology, physiology, anatomy, and kinesiology along with other sciences. I have stood in laboratories and taken VO₂ Max before most of you were born. I have had to do all types of tests and worked with PhD's in exercise physiology taking tests and doing studies. I have been invited to assist PhD's in doing special studies.

Scientifically, I am very well trained and enjoy studying and reading about science. I must admit that I am a bit of a nerd in that I have done such things as take a course on Solar Engineering and read such things as books on physics, mathematics, and astronomy for fun.

One of the most important courses I took in college was a course called Tests and Measurements. This course taught me how to custom design tests to measure anything I needed or wanted to measure in the way of athletic potential and improvement. This was an incredibly valuable course for a coach. The first thing we had to learn was the importance and meaning of

the different types of information you can obtain from tests. We learned what different information means and what it does not mean. We learned what information really is important and that which is not important. Basically, we learned the relevance of different types of information.

Next, we had to learn how to determine what information a particular test will and will not provide. I use this information when studying race courses, training courses, and race formatting. I have used it to custom design training programs knowing what the programs will and will not develop in the body.

This course was very important in understanding the relevance of the different forms of information you get from lab tests. It also taught me what information I need to collect as a coach, how to use it, and what it means and doesn't mean.

In this essay, I am going to share that information with you.

Information

I am going to break this essay down into three basic parts. This will be information you get from a Physiology lab, information you get from personal monitoring devices, and the information that you really need to collect and how to collect it.

Physiology Lab Information

Before I even began studying sports sciences in college, I had a coach, Gene Rypka, PhD, who gave me some information that helped me to understand the true importance of physiology lab information.

Dr. Rypka was a research scientist at the Lovelace Clinic and Sandia Labs in Albuquerque, NM. These scientists are among the best in the world. He had

two PhD's, several Masters degrees, and at least four Bachelor's degrees. Dr. Rypka was involved in biological research at Lovelace Clinic and regularly assisted in the Physiology Lab where they did research for organizations such as NASA. He was also my first cycling coach.

As I began studying sports sciences, Dr. Rypka wanted to make sure that I kept this information in a proper perspective and taught me the true significance of this information. He taught me that the physiology information that is often gathered about athletes is often meaningless.

He told me that, **"The greatest potential athlete in the world is probably a book worm in the back of some library who doesn't care about sports."**

Dr. Rypka stressed to me that the most significant part of an athlete is his mind and not his body. He told me about the person they had done research on at Lovelace who held the record for the lowest resting heart rate in the world at that time of only 26 beats per minute. He was a European bike racer whom I had never heard of before or since. He never won worlds, an Olympic medal, or the Tour de France. He was racing at the time of Eddy Merckx and I never heard of him beating Eddy or even being a serious contender. He was so insignificant as an athlete that I can't even remember his name.

But according to what Exercise Physiologists and the media teach you, he should have been the greatest athlete in the world. Obviously, they were wrong.

A much greater athlete was Lenard Nitz whom the Exercise Physiologist at the Olympic Training Center said should not have even been racing bicycles and should have been playing chess. Obviously, they were wrong again. Over the last 40 years of sports, I have seen them and their lab information

be wrong dozens of times. But these scientists and the media don't like to tell you about all the times they were wrong.

What does VO₂ Max mean to me as a coach when I am looking for champions or programming athletes? Nothing; absolutely nothing.

I have seen too many athletes with really great lab results who couldn't ride their way out of a down hill parking lot with a tail wind and a good push. I have seen many more athletes who didn't have such great lab results kick those riders' butts. There have been many world and Olympic champions in all sports who have had resting heart rates of 50 beats per minute or higher. I have known many losers who had resting heart rates of less than 40 beats per minute.

I have seen too many aspiring athletes go to a lab, get lousy results, be told they should not be in sports, and never recover from the depressing news. It is a huge mental obstacle to train and compete against having such "experts" tell you that you should be knitting instead of competing in sports. Most people cannot overcome such a huge mental obstacle. Because of this, I never took any of my athletes to an Exercise Physiology lab or permitted them to go to one.

I have learned that the most important step toward becoming a champion is to know that you can be one and not what some PhD tells you. How can you possibly believe in yourself as a potential champion if one of these "experts" convinces you that you can't be one?

If I am wrong about this, why do we still have athletic events instead of doing lab tests on everyone and handing out the trophies and prizes based on those lab results?

Personal Information Devices

I recently had a rider ask me when I was going to start using the wattage system for gathering information and regularly have riders ask me about using heart rate monitors for information gathering.

The truth is that I will never use either of those devices. The information they provide is not relevant to what I need to know in programming you.

For example, the wattage system tells you how much energy you are expending on a given ride. If you take total wattage expenditure for the entire ride, it means nothing to me because it doesn't tell me what you did on your ride and how you expended that energy. Did you do sprints, intervals, or power work? It doesn't tell me whether you got a really high-energy consumption from wind, hills, or sprints.

Most importantly, wattage output doesn't tell me what you will do in a race. Comparing your wattage output to that of your competition (as if they would tell you anyway) can't tell you how well you will do in relation to that competition.

A larger rider will have a higher wattage output at a slower speed because it will require more energy to move his mass at the higher rate of speed and he will have more wind resistance. Therefore, how could I possibly tell if you can beat him or will he beat you? How could I tell if you are going fast enough, working out right, or anything else about your racing and training?

As a professionally trained and experienced coach, it means nothing to me.

The best thing I have found heart rate monitors to be useful for is to teach a few athletes how hard is hard enough in their training. But you can do the same thing without buying an expensive piece of equipment by just putting them into a really fast race.

The only concern I have about your heart rate is to see if your resting heart rate goes up and stays high for three or more days. This is normally a good indicator of overtraining but can also mean that you are stressed out, taking a medication or drug, or any number of other problems. It has to be used with common sense. When your resting heart rate goes up, you check your training log to see if it is overtraining or something else.

If you think I am wrong, the next time you go to a bike race, I want you to watch all the people who are using all these expensive measuring devices and the information they provide **losing** races. I guess they really don't help these athletes as much as the media and manufacturers tell you, do they? Think about it.

Important Information

If you use just a little common sense, you realize that the really important information you need can be obtained with a decent \$25 to \$35 bicycle computer. What are the important questions you need to answer when preparing for competition?

The things you need to know are what is your competition's top end speed for sprinting and attacking purposes; how fast is their race speed or the speed they maintain during the heat of the race and attack out of; how fast do they go during a jam or chase effort; how fast do they accelerate; how fast do they climb on different grades; how fast do they recover from attacks and other efforts; and a number of other items that you can only learn from riding against them such as how do they ride a break to make it successful?

Then for sprinting and attacking, you need to know leg speed. It is only common sense that, to beat your competition, you have to get faster than them and it doesn't matter what your VO₂ Max or any other reading is. If you can't go that fast, you lose. If you can go faster, you win. There isn't a

lab test or monitoring device other than a bike computer that can tell you that.

So, what you really need is a computer to tell you what their maximum speed is. You also need to look down at that same computer to see how fast you are going when you are at race speed. Learn to check your computer during different parts of the race to see what your competition is doing and what you have to do. I always taught my racers to do this and regularly got information from them.

I also timed laps during a Criterium and considered this information in relation to the racecourse structure and race format. For example, a course with a sharp corner which required slowing down meant that the actual top race speed was faster than the lap time showed.

To determine leg speed, I create a leg speed chart. All you need to know is how fast you are going in a particular gear. You determine gear development or how far you travel per crank revolution in the gear and divide that into either a mile or a kilometer to determine how many revolutions you travel per mile or kilometer.

Next you put that in a formula with either miles per hour or kilometers per hour to determine how many revolutions per minute you are doing. I keep such a chart posted on a corkboard over my desk with the leg speeds for a range of speeds for the gears I tend to use the most for training. I have the leg speed for each gear for every five miles per hour.

For this, I use the two following formula:

First, I determine inches or meters per revolution with this formula: ($\#$ of teeth in chain ring \times diameter of rear wheel/ $\#$ of teeth in rear sprocket) \times π or 3.14. This gives me the distance I will travel in inches or meters for one revolution of the crank in that gear.

I use this number along with my speed in that gear in this formula to determine leg speed. $(\text{miles/hr})(\text{hr/minute})(\text{inches/mile})(\text{revolutions/inch}) = \text{revolutions/minute}$.

I'll give you an example of how this formula works:

Let's say I do 30 miles/hr in a 42x17 gear. First I get the gear development with a racing wheel diameter of 26.6 inches. It looks like this: $(42 \times 26.6 / 17) \times 3.14 = 206.46 \text{ inches/revolution}$. That means that for every revolution of one crank arm, I travel 206.46 inches forward.

Next, I insert this and my speed into the formula like this: $(35 \text{ miles/1 hr})(1 \text{ hr/60 minutes})(63,360 \text{ inches/1 mile})(1 \text{ revolution/206.46 inches}) = 179 \text{ revolutions/minute}$. Notice that I inverted the gear development to make it fit in the formula. To use this with the metric system, simply use the metric diameter for the wheel or any good metric gear development chart such as in the USCF rule book, use kilometers per hour, and use 1,000 meters per kilometer.

For a mathematic short cut to create a chart do all of the formula except the miles per hour to get a number and then multiply that number against each speed you want on your chart to get the leg speed you want for that speed in that gear.

It would look like this:

$(1 \text{ hr/60 minutes})(63,360 \text{ inches/1 mile})(1 \text{ revolution/206.46 inches}) = 5.11$. Then you multiply 5.11 against each speed that you want on your chart. For example, $5.11 \times 25 \text{ mph} = 127.75 \text{ rpms}$; $5.11 \times 30 \text{ mph} = 153.3 \text{ rpms}$; and $5.11 \times 35 \text{ mph} = 179 \text{ rpms}$. Then, when you get back from your training ride and want to see your top leg speed in a particular gear or what leg speed you maintained for most of your ride or just cruising, you just look at your

chart and estimate, if it is a speed between your listed speeds. I keep a chart with leg speeds for seven different gears.

I have found that, with what I learned from my class, Test and Measurements, I don't need to take my athletes to a lab to be tested. I can tell what you need to do for training by having you race on different types of racecourses and seeing how you perform. If you want to see how an athlete performs as far as acceleration and recovery, put them on a Criterium course with a 180-degree hairpin curve. Jumping out of that curve every lap will tell me really fast whether you have been doing your interval training.

A race I used to take my riders to for such purposes was the Manhattan Beach Grand Prix in Southern California. It has only two corners. They are both sweeping 180-degree turns, which you have to jump hard out of every lap. In just 10 to 15 laps, I could tell which of my riders had been doing their interval training because they were still racing. The riders who had not been doing their interval training would be standing next to me watching the race.

On the other hand, a flat, open Criterium course tests high race speed and flat speed. Climbing courses tests climbing ability. Points races test sprinting ability and recovery.

For acceleration, you ask two questions. First, when someone else attacks or sprints, can I stay with them? Second, when I attack or sprint, can others stay with me? The answers to those questions tell me how much I need to work on my acceleration. There isn't a lab test or monitoring device that can provide you with those answers and they are very important for racing.

I use this information to tell me where I need to improve and by how much. That tells me how to design my training program and racing schedule. It is just that simple.

For example, let's say that I find the riders in my class attack at 26 mph and race at 24 mph by glancing at my computer when going with attacks or while racing. If I get really tired at those speeds very quickly or can't stay with them at those speeds, then I know I must do more speed work until I can attack at 27 mph and race at 25 mph. After all, I want to have the advantage when I race. If they have a sprint speed of 30 mph, then I want to work on my sprint until I can do 32 mph.

For endurance or aerobic base, I send you out on a ride and see at which point you start getting tired. For example, let's say I send you out on a 60-mile ride and you start getting tired at 50 miles. I know that your effective aerobic base or endurance is 50 miles.

For power and speed, I use time trials. Team time trials also tell me how well you ride paceline. Track racing tells me a lot about speed, leg speed, recovery, and power. Track is really great training for sprint tactics because a track race is really the last part of a good road race or Criterium. It forces you to learn how to finish a race because all a track race is the finish of a road race.

Now explain to me how I can use VO_2 Max or wattage to tell me how fast I have to go to win sprints or break away. It can't be done.



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Part III • Chapter Six

Overtraining

Overtraining

The scientific definition for overtraining is to incur more damage than your body is capable of at least a 90% to 95% recovery within 24 to 36 hours following your exercise.

There are several misperceptions about your body's rate of recovery from exercise, which need to be addressed. There are two basic mentalities, which persist among most athletes. One is that as soon as you quit training, clean up, and eat, your body has finished recovering.

The other is a "little" more realistic and is that by the time you wake up the next morning, your body has finished recovering. Your body's rate of recovery is far more complex than that.

Rate of Recovery

The rate of recovery from exercise for your body is dependent on a number of things. These include the fitness level of your cells, your cardiovascular and cardio respiratory fitness, your general fitness and health (i.e. lack of illness), nutritional requirements for the rest of your body such as life support, growth, illness, injury, and pregnancy, and the amount of damage done during exercise.

The greater your fitness, the more damage your body can recover from in the same period of time and the less damage will be done by the same amount of exercise. Your fitness is a very key part to your recovery. Of all these factors, the one, which causes your recovery to be slowest, will

determine your fastest possible rate of recovery and is called the bottleneck factor for recovery.

As an example, let's say that your cell fitness level is the weakest point in this chain. You incur more damage and the cells rebuild more slowly than the rest of the body provides the molecular building blocks for rebuilding.

The fastest you can recover from the damage is determined by the metabolic rate of the cells. You can have a resting pulse rate of one beat per minute and your body won't recover any faster.

This should also tell you that the level of exercise required for overtraining is different for different fitness levels. A person who only rides 50 miles per week will be over trained if he rides 50 miles in one day. Where as, a pro who is used to riding 400 miles per week will go into overtraining if he suddenly increases to training from 500 to 600 miles per week.

When I was coaching in LA, a rider came to me announcing he was in dire straits. He had gone to a pro friend of mine for a training program and like almost all pros, my friend set this rider up on his own program. He told the rider to ride 3 hours a day, seven days per week for 3 weeks and then come back to see him.

The rider rode one ride and spent the next three days in bed unable to move and in incredible pain.

I asked the rider if my pro friend had first asked his fitness level and he said my friend had not. So I asked how far he had ridden in one ride and how far he was riding per week. He had never ridden more than 20 miles in one ride or 20 miles in one week. He normally rode 10 miles one or two days per week.

My pro friend had had the rider ride more in one ride than he had ever ridden in two weeks combined. The rider was severely overtrained. This rider should have been started out on a program of spinning easy for about 30 to 45 minutes or 5 to 10 miles a day, three days per week for at least three weeks just to get his body used to exercising.

This is one of many examples of some star struck rider getting in trouble by trying to train like a pro. It happens every year to tens of thousands of cyclists. If you can't ride like a pro, don't even think about training like a pro.

My professional opinion is that the only people who should read books about training, which were written by pros, are coaches and other pros. No one else has any business even reading about their training programs except to be amazed at the pro's fitness level or see how far they have to go in fitness development to become a pro.

A rule of thumb which is used by all exercise physiologists and professionally trained coaches to determine the **MAXIMUM** that you should increase your mileage from one week to the next is that you should not increase your mileage from one week to the next by more than a **MAXIMUM** of 5 to 10 percent. Almost all of us prefer to keep that increase down into the 1 to 3 percent range.

In other words, a person who is training 300 miles per week should not increase his training from one week to the next by more than a **MAXIMUM** of 15 to 30 miles. Normally, we would increase that mileage by about 5 to 10 miles for best fitness development.

At the really low end, such as with the rider above, you have to increase it by more because 1% to 3% of 20 miles won't even show up on most computers.

Besides, almost any person should be able to handle spinning easy for 5 to 10 miles three times per week. That is a very minimal fitness level. It is about two breaths above death. :)

Misinformation

There is a whole group or school of exercise physiologists (EP's) who like to believe that it is not possible for an athlete to overtrain. They get a lot of people in trouble or hurt by preaching their false philosophy. Riders and coaches who believe this philosophy go out and either have their athletes make incredible increases in training or do so themselves as athletes. Coaches, other doctors, and myself get to pull these athletes out of trouble after they listen to these EP's.

I love to get in a discussion with these EP's and move them into a discussion about the maximum an athlete should increase their training from one week to the next. You see, even they believe that the maximum an athlete should increase his or her training from one week to the next is 5 to 10 percent.

HOLD IT! If it isn't possible to overtrain, why can't I go from riding 100 miles one week to riding 600 miles the next week? They contradict themselves don't they? Yet these people don't have enough common sense to realize that they do contradict themselves. College provides knowledge but does not teach common sense and knowledge without common sense gets people hurt. Be careful to whom you listen.

Unfortunately, most coaches and athletes who listen to these people don't know enough about exercise physiology to know better and respond with the logic I used above about going from 100 miles one week to 600 miles the next and people get hurt. These EP's don't realize that most people don't have enough common sense to use such logic and when provided with misinformation will get in trouble.

Rest Cycles

It is because of this understanding of the body function in relation to exercise and rest that we have developed what we call rest cycles. In the simplest form, these are days programmed into your weekly training program to permit your body extra time for recovery.

Rest cycles can also be other time periods programmed into your training calendar to permit catch up recovery. I have five different types of rest cycles I use in my program. I call these phase one through phase five rest cycles.

Phase One Rest Cycles

These are the days of rest programmed into your weekly program, which permit your body to have more time to recover from anaerobic and extensive aerobic workouts. They are a must to keep from overtraining within weeks. The most common cause of overtraining is caused by the elimination of these rest cycles.

What usually happens in cycling is the rider or coach realizes the extreme complexity of fitness development required for road racing and doesn't know how to properly program the different types of workouts within a three day system like what I use in my Weekly Training chapter. I call my method 'stacking.'

They usually start by doing anaerobic and endurance work three to four days per week but quickly realize that they must do some extra work for sprinting, time trialing, or climbing. And then they will say, "Oh let's see, I have a day here where I am not doing anything." And there goes a rest day. Before you know it, they are doing anaerobic and endurance work five to seven days per week and rest is zero. Their performance continues to improve for a while and then it goes flat before it finally starts to fall off.

What happens during those different parts of overtraining?

While your body is still improving, it is capable of adding molecules faster than you are tearing them down. After awhile, you begin to catch up to where you are tearing them down as fast as your body can rebuild them. That is when your performance goes flat.

Most riders just think this is their maximum physiological potential and either quit competing or give up on improving or turning pro. What they need is a good program using rest cycles. Your performance starts to drop when you have reached a point to where you are tearing down more molecules than your body can rebuild. We call that peak out and riders who get stuck here usually quit racing within one to two years.

How do they get there?

They start out with a bad training program and gradually lose ground until they go flat. When they go flat they become frustrated and want to get better. Thinking that they have hit a performance peak and that more training will make them better, they start doing more damage to their bodies and eventually reach the point to where their body can't keep up. (Does this sound like you?)

Their efforts are self-defeating. What they really need is rest to let their body build to a higher level.

You can see this in several examples:

First, you have the rider whose performance is like a roller coaster. They are up for a while and then down for a while and then back up for a while. This will go on for the entire season. What happens here is that the rider puts his body into such a high level of overtraining that his body can't handle the

workouts and forces him to slow down. When he slows down, it permits his body to recover just enough so that his performance comes back up, he starts hammering again, and crashes his body again. What this rider really needs is about two to four weeks of sitting still reading this book. :-)

The other example is for people who either get hurt or sick and are forced to stay off of the bike for a while. You would think that they would come back weak and out of shape but they come back stronger and faster than ever.

If you have been in racing for a few years, you have seen this happen. The reason this happens is because the rider has gotten his body into such a terrible state of overtraining that it takes his body anywhere from a few weeks to several months to finish rebuilding. Them getting sick or hurt was the best thing in their training program. This brings in phase two rest cycles.

Phase Two Rest Cycles

These are rest cycles I use when I feel that a rider is getting a little overtrained. I make them take anywhere from one to three extra days off with easy spinning or off completely depending on how serious their problem is. I always try to catch it before it gets serious enough to warrant taking the time off completely.

If the rider starts to develop some of the early symptoms (I will cover these later), I have them miss a race or just spin for a few days. Their performance comes back up and things are fine. Most racers are afraid of taking some time off because they don't know how the body works and are afraid that if they lose even one training day, their competition will gain on them.

The truth is, the opposite is true. They will gain on their competition. Your cells don't replace those little molecules as fast as you have been lead to believe. It takes time to replace them and you must let your body have that

time. It should be common sense that if you permit your cells to finish rebuilding to a higher level, your performance will also be higher. Think about it. It works.

Phase Three Rest Cycles

This is a two-week rest period I made my riders take at the end of the season before beginning the off-season. They were not even permitted to do running or any other activity as training. They could only do occasional, light, recreational activities. You see, even with my program, you will cumulate some residual overtraining that you need to get rid of before you can start your off season work.

They were human and didn't like to do it but were good little athletes and did do it. They always (not one exception) came back much stronger and faster than at the beginning of the two weeks. They would spin their legs out for one or two days and be flying. Some would sneak off to a race against my orders at the end of the two weeks and be so excited about how much faster they were that they had to come blabbing to me about how they had violated my orders.

I would chew them out for breaking training and then laugh at them for being so funny and excited after they left. Coaching can be fun.

Think about this: If the riders in my program were still so overtrained by the end of the season that it would take two weeks for them to completely recover, how much more overtrained are you on your program?

Phase Four Rest Cycles

This was a two week recovery period I had at the end of the off season to permit them to get rid of any overtraining from the off season. All I did was to cut their miles in half for two weeks before they started the on season program.

Phase Five Rest Cycles

This is a special rest cycle I never had to use. It is for the veteran pro who is getting burned out on racing and loses his mental edge. You basically have him take from six months to a year off from racing while only permitting recreational cycling and other sports. It is more for mental purposes than anything else.

Mental Overtraining

That's right, you can also overtrain the mind. Mental burnout is the most common cause of veteran riders leaving the sport.

I used my rest cycles for this as much as anything else. When I saw a rider starting to lose his zest for racing and training, I would make him take a few days off or miss a week of racing. They would start missing their routine and the competition. The next thing you knew, they were hammering off the front of the pack like mad men.

I even took it further than this. I always tried to not let them race as much as they wanted to race. I called it starving the mind. This kept them chomping at the bit to race and train. Their racing was always sharper and more aggressive. They wanted to race every race on the calendar. I would restrict it to only one race per week most of the time and they would hammer that race to pieces. On a controlled basis, I would permit them to

ride two or three races on a weekend and they would storm. It was like letting them out to play.

I always tried to make their training and racing play so they would enjoy it more and want to do it more. It worked.

Overtraining Symptoms

The earliest symptoms of overtraining have to do with the riders losing their mental edge and zest. They aren't quite as eager to hit the front or train. They may want to take it a little easy today. Their racing and training has stopped being play and has become work.

The more serious symptoms are fatigue, excessive dreaming and loss of sleep, aches, head colds, sniffles, and muscle soreness. They will stop improving in performance and go flat. Then their performance will drop off. This leads to frustration and loss of interest in racing.

The really extreme symptoms are severe muscle soreness, muscle strains, pulls, and tears, severe fatigue, serious illness, serious performance decline, and muscle cramping. By this time the athlete is in serious trouble and will take anywhere from weeks to months off one way or another (voluntarily or involuntarily.) If he hasn't been hurt and doesn't back off to recover, he will get hurt. Then he will back off to recover.

The muscle strains, pulls, and tears are caused when you have done enough damage to the cell that it doesn't have sufficient molecular structure to withstand the workload you are placing on it.

With the strain, there will be minimal giving of the moving parts of the muscle cell when loaded which will cause light molecular damage to the cells. The pull occurs when the movement is enough to destroy more of the molecules holding the cell contracted and results in serious damage. The

muscle tear is when the molecules holding the moving parts inside the cell completely give out forcing the cells walls to take the full load and they tear destroying cells. You don't want any of these, especially the last one because you permanently lose muscle mass.

The cramping occurs when you have done enough damage to the cells so that they cannot release after a contraction. The sustained contraction puts pressure on the blood vessels starving the muscles and causing them to malfunction even more. Light massage and stretching are necessary to relax the muscle and return blood flow to it.

My program and common sense will help you avoid these problems while growing throughout the year because that is what it was designed to do. It works.

Overtraining And Growth

Overtraining becomes most serious when growth is involved. This applies to Juniors and pregnant women. Growing requires a large number of molecules. Every new cell requires over a trillion new molecules.

If your existing cells become so thoroughly damaged as to require very large amounts of molecules to rebuild, then the old cells will get what molecules are available and the new cells will do without or simply not come into existence. This means that overtraining can prevent or diminish the growth that was supposed to take place during that period of time. Therefore, overtraining can stunt the growth or development of the Junior or fetus.

Juniors and pregnant women need to be very careful about overtraining and nutrition. A professionally designed program and close monitoring should be done during periods of growth.

Your body has programmed priorities for the use of molecules in the event that there should be a shortage. This is a survival mechanism built into our bodies. The first priority is for life functions to keep the organism alive. This covers such things as your cardiovascular system, cardio respiratory system, and brain.

The second priority is to repair damage such as from injury, illness, or overtraining. This is also meant to keep the organism alive. The last priority is for growth.

During periods of nutritional deficiency, your body will shunt blood to the parts of the body, which are most crucial to survival. During famine, most women will even stop ovulating because it is not a life function and requires more molecules.

Always remember, no molecules in, no molecules out.



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Part III • Chapter Seven

Warm-Up & Warm Down

Warm-up & Warm Down

Most athletes know that they should warm-up and warm down but don't know why. For this reason, most of them either don't warm-up and warm down or don't do it properly.

When I was coaching, it was not that uncommon for my beginning to intermediate racers to ignore my instructions to warm up before a race. The first time they would ride a 40 plus mile race, they would come to me amazed at how their performance improved after the first 25 to 30 miles in the race and wanting to know why.

After they found out that their legs had finally gotten warmed up, saw how much their performance improved, and realized that they had been forcing themselves to race with a handicap by not warming up, they always started warming up before every race. It works.

Warm-up

The primary purpose of warming up is to increase the blood flow to the area of the muscles, tendons, and ligaments in order to "warm them up." We know that increasing the blood flow to an area increases the suppleness of the tissue in the area. The increased suppleness of the tissues does several things.

First, it decreases the probability of strains, pulls, and tears to the tissues during exercise or competition. Second, it makes it much easier for material to diffuse in and out of the cells, which increases the cells' ability to function.

But, why? To answer this, we need to start with a little simplified nuclear physics and physiology.

The blood in your body contains heat or energy. When we increase the blood flow to an area we are increasing the amount of heat moving into the area. Plus working the cells generates additional heat in the area. This increased energy causes the atoms that make up your molecules in that area to increase their motion.

When the motion of an atom increases, it moves a little further away from the surrounding atoms even though they remain bonded together. The increased distance between the atoms makes it easier for the atoms to move in relation to each other. This increased ease of movement is what makes your tissues more supple and less brittle, decreasing the tendency for damage to the tissue from harsh use.

The increased distance between the atoms means increased distance between the molecules, which the atoms make up. This increased distance between the molecules in the cell membrane provides more room for other molecules, which need to get in or out of the cell to move between the molecules of the cell membrane. This accelerates the rate for diffusion of molecules, such as water, through the cell membrane.

The increased motion of the atoms causes the molecules to move faster which also increases the rate at which the molecules will move through the cell membrane. Also, heated and faster moving molecules chemically react faster with other molecules. This causes the molecules in your cell membranes, which cause the active transport of other molecules across the cell membrane to move the material fast. This increases the potential metabolic rate of the cell.

Faster moving molecules inside the cell will also move and react faster, which also increases the potential metabolic rate of the cell.

All of this comes together to mean that your body will function more efficiently and faster with a decreased tendency for damage to the tissues; in other words, warm-up before the race.

Proper Warm-up

Proper warm-up for cycling does not have to be the same as proper warm-up for running for several reasons. When you walk or run, the muscles you use for propulsion are also being used for body support and balance. These are very stressful factors, especially during running.

In cycling, you can not only protect your tissues from weight bearing and impacting during the activity, but you can also decrease the amount of workload on the tissues for the activity by shifting to a lower gear. For these reasons, it is usually not necessary to stretch before getting on the bicycle for warm-up. As a matter of fact, most of the time, you can do your entire warm-up, including stretching, on the bike.

You simply start by parking your candy, little tush on your expensive saddle, shifting into a nice easy gear and spinning very easy for a while. You will notice that your legs begin to loosen up and feel better as you ride. As your legs begin to warm-up, you should start doing some stretching by point your heels towards the ground, then pointing your toes, and standing up occasionally. It should take you at least one to one and a half hours to warm-up right before a race. This is about 20 to 30 miles for intermediate to advanced racers. Beginners might get warmed up at around 15 to 25 miles.

Stretching is really nothing more than moving your joints towards their extremes in range of motion. You never want to stretch hard enough to

cause pain. If you have your bike set up properly, the only real extremes you can have are to point your heels, point your toes, and to stand up.

You always start out easy and let your body tell you when it is time to increase intensity and movement on the bike. You should gradually progress from very easy riding and movements on the bike to more moderate riding and movements and then, finally, to some jumps and sprints at only about 80% to 90% as your body tells you that you are ready. You should go to the line lightly sweating but not tired, especially for Criterium and track racing.

On very cold days, especially when the wind is blowing, you may notice that you are not warming up on the bike. You will have to ride for a little while, get off of your bike to do some standard runners' stretches, and get back on the bike. For really nasty days, you may have to repeat this two or three times to warm-up. Keeping your legs covered during the warm-up on cool to cold days improves your warm-up.

Cold Weather Protection

It is very important to keep your legs covered in very cool or cold weather. When your legs make contact with the cold air molecules, the air molecules absorb some of the heat in your skin tissue, their nuclear motion increases, and they accelerate away from legs that are now a little more cool in temperature. This slows down the atoms, which make up the molecules that make up the tissues in your legs. The atoms get closer together and the tissues become stiffer and more brittle. This increases the probability of doing tissue damage, particularly to the tendons and ligaments.

By placing layers of molecules which transfer heat more slowly between your skin and the air molecules, you can decrease the rate of heat loss in relation to heat generation by the cells. This keeps the atoms in your tissues "hotter" and your tissues less susceptible to injury. In other words, cover your legs in very cool to cold weather.

Warm Down

When you have been racing or training hard, it is important to warm down afterward. This is particularly important when anaerobic work was done because of the build up of lactic acid in the cells.

Lactic acid interferes with the action of the cells and slows your rate of recovery and rebuilding. To increase the rate of removal of lactic acid from the muscles, you want to flush the cells with blood without creating more lactic acid. Aerobic exercise does not generate lactic acid and flushes the cells with blood. So a great way to increase your rate of recovery is to spin a small gear for about an hour or so after your race or workout.

As a matter of fact, if you eat and drink before and during warm down, it will also increase your rate of sugar and water replacement by moving these and other nutrients to the cells faster as long as you don't over extend the workout.

I had my riders do a "warm down" between a race and doing more miles after the race. Within about 20 to 30 minutes, dead legs would start coming alive again and they would get a good aerobic workout increasing their endurance considerably.

Without understanding the science, a lot of pros have learned to do this during the race itself. The racer will hit the "wall," grab a wheel, bite the bullet to keep from getting dropped, spin their legs out in the middle of the pack, recover, and jump back into the race. The best pros have learned to use this technique so well that they can hit the wall as many as five or six times in a race and still be in the hunt for the win at the end.

The best example of a rider who religiously used warm-up and warm down was Eddy Merckx. He would ride 20 to 30 miles before and after almost

every stage in the Tour de France. He almost always rode from the hotel to the starting line and from the finish line to the hotel. The other riders would show up in their team cars before the race and pile back into the team cars right after the stages. If they did a warm-up or warm down, it was minimal.

This meant that Eddy would recover better between stages which gave him an additional advantage over those who didn't warm-up and warm down. This becomes more important as the number of stages in a race increases.

If you think about it, if Eddy averaged an extra 50 miles per day, then he did an extra 50 miles per day in aerobic fitness or endurance development. If the other pros did 100 miles of aerobic development, then Eddy did 150 miles. Guess who would have the most endurance in following races? You know, like next year's Tour.

Let's see, if your aerobic fitness level is 100 miles, you will probably start getting tired at around 75 to 80 miles in the race. But, if your aerobic fitness level was 150 miles, you wouldn't start getting tired until at least 120 miles into the same race. Can you figure out who would do best in the last 20 to 30 miles in a race? No brainer, huh?

Warming up and warming down not only improves your race performance and recovery, but also increases your aerobic fitness or endurance level. Do your warm-up and warm down or pay the price to those who do.



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Part III • Chapter Eight

Your Race Calendar

Your Race Calendar

There is a strategy to organizing your race calendar. It has to do with fitness development and focus. You need to put your races into three categories.

In the top category you will put from one to three races. These are the most important races for the season. You want to win these races more than any of the others. Greg Lemond used to have two races in this category, the Tour and the World Road Championships. It helps to pick races that are at least one month apart.

The second category will have from four to six races. These races are not as important to you as the races in the first category but are more important to you than the rest of your races. They should be reasonably spread throughout the season starting at about the second or third month of the season.

The rest of your races belong in the third category. You will want to win these races but not at the expense of losing the more important races. This means that you cannot hold back or sit in to win these races. If you can't race hard and aggressive from start to finish and still win or place in these races, then you get the workout first.

Remember that the pros use racing to help them prepare for their most important races. They will hammer themselves completely out of some races to maximize their fitness level for other races. This is especially true for

races earlier in the season. If you don't set priorities and categorize your races, you will place the same value on all of your races.

It is much easier to hammer yourself out the back of less significant races to develop for more significant races.

Think of your "category three" races as being training races for your "category two" races. Of course, you need to think of your "category two" races as being training races for your "category one" races. This puts everything in the proper perspective.

The strategy is to race hard and aggressively in the lesser races to increase your fitness for your most significant races. This means that you need to develop your strategies and tactics around aggressive racing. The harder and more aggressively you race, the faster and farther you will improve.

You ride your cat 3 races at 100% to develop for your cat 2 races and, if you also win, great. If you are progressing properly so you can race aggressively and still win your cat 2 races, great. If not get the workout first. Then, you can race aggressively while holding back a little to win your cat 1 races.

If you ride the rest of your season right, you shouldn't have to hold back to win your cat 1 races. That is your ultimate goal.

Racing Frequency

Another coach recently emailed me asking for advice concerning a very common problem in areas where you can race on both Saturday and Sunday on a regular basis. I could tell from his comments that he is a well-trained coach (college.) He has been trained in using the standard weekly program I explain on my training page.

His problem is that he is having trouble dealing with his riders overtraining from racing on Saturdays and Sundays and is having to manipulate his rest cycles every three weeks to help them to recover.

I had to deal with the same problems in California. If you race on Saturday and Sunday, do intensity on Tuesday and Thursday, and do endurance on Wednesday, you are causing considerable molecular damage to your body FIVE days a week and only allowing it two days for recovery. You will go into over training within two to three weeks.

He asked me about changing the weekly schedule to racing Saturday and Sunday with intensity work only on Wednesday. That would give his riders bodies four days per week to recover but, by working the muscles hard two days in a row, it still causes enough cumulative molecular damage in just two days that the four days are not enough for adequate recovery. You will still over train in about three to four weeks.

How Frequently Should You Race?

This depends on a number of things and the answer will often change from one week to the next. The biggest question you have to answer is, "Are you more concerned about immediate racing fun or long term development? Do you want to have fun winning at your present level or at a higher level?"

Any rider, who is more concerned with promotion and development, especially those wanting to go pro, should only race one race per week as much as possible. This is to maintain the integrity of the training program for long-term growth and development. You really should not race more than about five or six weekends of two days of racing or stage races on an annual basis for maximum development. Riders who want to move up the

ladder of success must learn to think and plan years into the future instead of thinking about immediate fun.

Remember that I told you that the road to success is littered with sacrifices. Some of those sacrifices happen to be races you want to ride but know that you need the rest more so you can improve more quickly.

I used this system with my racers who wanted to go to the top. They passed other riders so fast that they never had to look back at riders they left behind. Any riders coming up from behind never caught them in fitness. They improved so fast that riders were always saying, "Who are these guys?"

I remember when my first riders became cat 2's at the end of one season. The next January we did a little 10 mile TT as a pre-season check for my riders. A number of top cat 2's were there with their funny bikes and disc wheels. We didn't have any disc wheels, much less funny bikes. My riders rode their road bikes and won the race. The other riders were so stunned that they gathered across the road from my team while we were loading up to go home blatantly staring and whispering. Six months earlier, they didn't even know who my riders were. It works.

But let's say that I have a rider who just wants to remain a cat 2 or 3 and race with his buddies as much as possible. Then I permit this individual to race Saturday and Sunday about two to three weekends per month being careful not to let him get too far into over training or psychological burnout. But this is only if he can race hard at the front and still win and place or at least help his teammates do so.

Struggling in the back of the pack two races in a row isn't any fun. If you can't mix it up at the front and be in on the tactics, you are not racing bikes. Get in good enough shape to really enjoy your racing.

Always remember that when you add an extra day of intensity on a weekend, you have to take one away the next week for recovery. You can only do that for about two to three weeks before you will have to go into a rest cycle to keep you from going so far into over training that you peak and crash.

This means that you have to have a coach who knows how to manipulate those rest cycles for recovery. My program is designed to help with this a lot. Learn to use it.

A very common problem for weekend warriors is to race too many Saturday and Sunday races early in the season, over train and/or have mental burnout by June, and disappear until August. They miss the best racing of the year because they fried their minds and bodies too early. Pace yourself and you will enjoy many more races.

For my more serious riders, I don't let them ride as many races as they want to "starve" their minds and keep them hungry for aggressive racing. This keeps them developing more quickly and makes them enjoy the races they do ride even more. They still love racing year round.

I used a special technique for first year riders. It is a "crash" (no pun meant) course in racing. I let them ride as many races as they wanted as long as they didn't get too fried. I did this for two reasons. The first reason was to let them ride enough races to get hooked on the sport. I just let them have fun.

The second reason was to provide them with as much experience as possible as quickly as possible so they could better relate to the material I taught in my weekly lectures. This way, they learned and improved more quickly.

So, what do you want out of cycling? Answer that before you decide anything else.



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Part III • Chapter Nine

Big Mistake

Big Mistake

From the questions I am getting from racers, I am learning of a very serious mistake being made and that is, using percent of heart rate for training.

Far too many of you are just going out and running your training up to the desired percent of heart rate for the desired period of time. This is causing you to develop a strong sustained steady state or power out put but nothing else.

You will make great time trialists but lousy road racers.

Great road racing is much more than just going hard for a long period of time. It involves attacking, chasing, bridging, breaking away, sprinting, and recovery from all of this so you can do it again and again. It involves climbing and flying on the flats. It involves spinning the little gear and pushing the big one. If you ignore developing the fitness characteristics for any of these things, you will not develop the fitness to effectively do these things.

This will develop fitness and tactical weaknesses in you and your racing that people like me will gladly take advantage of. **If you don't do it in training, you can't do it in racing.**

This is why it is necessary to develop complex and structured training programs, which will focus on doing these things. I have warned about this problem in my other chapters and cannot over emphasize it.

THERE IS MUCH, MUCH MORE TO CYCLING THAN JUST BEING ABLE TO SUSTAIN A GIVEN LEVEL OF OUT PUT FOR A GIVEN PERIOD OF TIME.

Don't forget that.

If you can't attack, sprint, or recover, I will quickly learn it and destroy you with it. The first round in boxing is always spent testing for weaknesses in your opponent's boxing style. The same is true for cycling. The first attacks or sprints are spent looking for weaknesses in your competition. You attack, jam, and jump to see where your competition cries and then use that to break their legs.

Where are **YOU** weak? That is where I will attack you. You say you don't have good leg speed? Good, that is where I will attack you. I will take the speed up until you are spun out and then attack you. You will start bouncing in your saddle which will make you want to back off and your muscles won't be able to release fast enough to relax between down pushes causing the blood flow through them to decrease and they will cramp. I will break your legs.

You say you didn't develop the strength to accelerate quickly? Good, then I will attack you repeatedly causing your muscles to prematurely fatigue and break. You say you didn't do your intervals so you don't have recovery? Good, then I will change pace constantly causing you to quickly fatigue and break. You will breathe so hard you will swear that there isn't any air left in the world as you watch me ride off.

Please explain how all this sustained HR training is going to help you if you don't develop the right fitness characteristics to do these things.

You better develop that sustained riding ability very well because you are going to need it to chase me down again and again as I break your legs

every time. And then, even if you catch me for the sprint, what are you going to do when you have no top end speed or acceleration to beat me in the sprint? You will have suffered miserably for the entire race only to be pitifully defeated at the end because you don't train to develop fitness characteristics. You only train to develop sustained effort or power.

Oh, did I tell you that I also train to develop power and endurance? You know what will happen? I will break your legs, you will have to slow to spin them out and recover while I gain distance on you, and you will spend the rest of the race chasing me with your sustained HR fitness.

Does that sound familiar to you? If it does and you are doing sustained HR training, it is because other riders are already doing it to you. Think about it.

You **MUST** do fitness characteristics development or people like me who do will crush you again and again. If you don't do fitness characteristics development, then people like me will love you very much and thank you for making it easier for us to beat you. On their behalf, I say "Thank you."

Read my other chapters on training!!



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Part III • Chapter Ten

Cramping

Cramping

I get a lot of emails asking about cramping and its causes. Even though I address some of those problems on the pages Carb Loading and Feed Zone, in this chapter I'm going to address the problem a little more in-depth.

By the end of this chapter, you should understand why it is difficult to diagnose why a person has problems with cramping and why you have to look at your training, diet, and other potential causes.

Electrolytes

Since I discussed electrolytes in the Carb Loading and Feed Zone chapters and don't want to be too repetitive, I refer you to read or reread those chapters.

Sodium

Decades ago, research showed that sodium or table salt **MAY** be linked to high blood pressure. This created a panic and fad belief that sodium was not good for us and we not only began trying to limit sodium but also began to eat "sodium free" foods.

Later they found that sodium really does not have a relationship to high blood pressure but it went almost unnoticed because it was not the sensational story as the fear of sodium possibly causing high blood pressure. Therefore, the low sodium and sodium free fad has continued.

A few years ago, scientists became aware of a problem with people who were just doing even occasional exercise. They began to do research into the problem and found that people not having enough sodium in their diets caused it. These problems included cramping, dizziness, fatigue, incoherence, passing out, and even in extreme cases, people becoming comatose and dying.

Once again, a diet fad has not only turned out to be wrong but potentially fatal. We do need sodium in our diets especially when exercising. The rule of thumb here used to be one salt tablet for light to moderate exercise and two salt tablets for heavy or extended exercise. One of the most important things for athletes is to lay off the low or no salt foods.

Dehydration

It has been known for quite some time that dehydration can cause cramping.

The reason for this is that, as your body water level decreases, your blood and cell tissues become more viscous or thicker in content. This inhibits the fluid activities for life functions slowing transport of nutrients to cells and wastes from cells while also slowing the rate of cell functions themselves. These things in combination will cause cramping. Therefore, it is very important to remain properly hydrated while racing or exercising.

To help prevent this, you must drink regularly before, during, and after all activities. As temperature and humidity increase, so must your fluid intake. You need to drink enough fluids that you don't really get thirsty. Especially in races or training.

You need to drink early and often while exercising. Hydration is also a very important part of my recovery system.

Fatigue

Fatigue is a commonly over looked cause of cramping. If you push your cells to a point of fatigue to where they will not function properly, it should only be common sense that they will tend to cramp because cramping is a malfunction of the cells.

Any time you have fatigued yourself and you cramp that alone could be the cause.

This should tell you that an important prevention or cure for cramping is to have good coaching with a fitness program which will take you to a fitness level where you should not become fatigued enough to develop muscle cramps. Fitness is very important to prevent cramping.

Overtraining

An almost never mentioned cause for cramping is overtraining. Remember that overtraining is to not permit the cells to have adequate time to properly rebuild from the molecular damage done during exercise. It should only be common sense that muscle cells, which have not been permitted to properly recover from exercise to the point that they become overtrained, will increase the potential for cell malfunctions such as cramping.

As a matter of fact, you will find that the single most common cause for training related muscle injuries such as strains, pulls, and tears is not improper stretching but overtraining.

When cells are not given time to properly rebuild from exercise, their structure is weakened making them more susceptible to such injuries. I never had any problems with these types of injuries in my athletes because I programmed them so that they would not become overtrained.

If you persistently have problems with such injuries, get a new program or even new coach. You will be surprised at how those problems can disappear with a good training program.

Therefore, it should be common sense that the best prevention for cramping and injury from overtraining is a good training program, which permits the recovery time needed to prevent overtraining.

Summary

In summary, you need to follow my instructions for electrolyte use, get plenty of sodium (table salt), drink plenty of fluids, develop your fitness level to where you are less likely to reach a fatigue level where you may cramp, and have a training program which will prevent overtraining.

The best prevention or resolution for cramping is good diet and coaching.

Recovery

When a cramp does occur, it is important to **LIGHTLY** massage the muscle (hard massage can cause tissue damage to a cramped muscle), light stretching, rest, hydration, and carb loading to provide the fuels required to help the body more quickly recover from injury.

The message is meant to increase blood flow because one of the effects of cramping is that the constantly contracted muscles restrict blood flow increasing the muscle cramping.

Therefore, increasing the blood flow through light message is important. Plus light message also helps get the cells to relax, as does the light stretching.



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Part III • Chapter Eleven

Multi-Sport Training

Multi-Sport Training

Training for two or more different sports at the same time is very difficult to program and almost always leads to overtraining. It does not have to lead to overtraining. The problem and solution have to do with psychology and understanding the problem from a scientific perspective.

The natural human tendency is to think of it as requiring having separate and complete training programs for each sport being attempted. This is the wrong approach and will always lead to overtraining, especially when two or more of the sports use the same muscles or muscle groups.

The normal human response to this problem for a triathlete is to do intensity for cycling on Sunday, Tuesday, and Thursday; do intensity for running on Sunday, Monday, and Wednesday, and then add swimming intensity on Sunday, Tuesday, and Thursday. Plus, they want to have endurance days for each sport.

I hope you realize by now that it does not matter what activity you are using to work a muscle or muscle group, working that muscle or muscle group hard two days in a row will cause overtraining. The above training system will cause you to work your leg muscles hard five days in a row.

Proper Multi-Sport Programming

There are two steps to programming for multi-sport training. The first is to use kinesiology to determine which muscles and muscle groups require

conditioning, through what range of motion they require conditioning, and the type of fitness development is required for each muscle or muscle group.

The second step requires that we discard the sports mentality and think muscle. The question quickly becomes:

"How can I condition this muscle so it can most effectively accomplish the required tasks?"

You have to understand that your muscles do not know when you are riding a bike or running. They don't have any rational intelligence. They simply and biologically realize at the molecular level a given requirement for resistance, rate of contraction and release, and duration of work or number of repetitions. They are very stupid little biological units, which respond to stimulation from your nervous system.

At this point, the problem becomes surprisingly simple. You have to condition the muscle so it can meet the functional requirements you wish it to achieve. Then you simply use your knowledge about the function of the human body in relation to exercise and rest to develop a training program to meet those requirements.

At this point, our knowledge of cross training comes into play. We know that running and cycling condition the bulk of the leg muscles in a very similar way. We can achieve most of our fitness development with either sport or activity. Therefore, our first concern needs to be how to develop the muscles while addressing the slight differences in the development provided by the two activities.

The solution becomes surprisingly simple. As an example, I will show you how a good triathlon program should be designed. It will meet all of your fitness development requirements and avoid overtraining.

We are going to assume that you have attained the fitness level to prepare for the Iron Man Triathlon. This requires the fitness for a 2.4-mile swim, 112-mile bike ride, and 26.2 mile run.

We now have the aerobic fitness level for our athlete and can plug that into the training program. But remember that it is best to develop your aerobic fitness level to at least 110% to 120% of what will be required to accomplish the event so you will have the staying power to go well beyond the required distance of the event.

Therefore, the athlete should gradually condition over the year to a point where he can regularly train with a 125 to 150 mile bike ride, a 30 to 35 mile run, and a 3 to 4 mile swim every Sunday starting about 4 to 6 weeks before the event. This will provide our athlete with more aerobic fitness than is required to complete the event.

Now our concern becomes developing the required anaerobic fitness development to win the event. We must first answer the question:

"Which anaerobic fitness characteristics are necessary to win the event?"

The Iron Man is basically a three-sport endurance time trial. Speed is required because being the first one to the finish line means being the fastest athlete. Power is also required because it is a steady state, sustained effort. Do we need to develop acceleration or recovery from anaerobic efforts? No. Remember that we have addressed the endurance requirement with our aerobic development and will reinforce this during the week.

Anaerobically, we need to develop speed and power. See how simple the process gets? The question we now face is how to develop that speed and power for three activities without overtraining. This is simple, since we get very similar results from running and cycling, we can alternate them to obtain the body fitness required.

The program will look like this:

(Remember that this is for the athlete who has conditioned to train at this level over a period of years.)

Sunday: 125 to 150 bike ride with 2 to 3 speed sprints plus jams for power; 30 to 35 mile run with 2 to 3 speed sprints plus jams for power; 3 to 4 mile swim with 2 to 3 speed sprints plus jams for power. This should be about a 10 to 12 hour workout for a properly trained athlete. This will be when you find out how much you really want it.

Monday: Warm-up on the bicycle and go home (10 to 20 miles easy spin on flat ground.); warm-up in a pool and go home (3 to 5 laps easy depending on the size of the pool.)

Tuesday: Run 30 to 40 miles with 2 to 3 speed sprints plus jams for power; 2 mile swim with 2 to 3 speed sprints plus jams for power.

Wednesday: Spin easy on the bike for about 30 to 40 miles on flat ground; warm-up in the pool and go home.

Thursday: 80 to 100 miles on the bicycle with 2 to 3 speed sprints plus jams for power; swim 3 miles with 2 to 3 speed sprints with jams for power.

Friday: Spin easy on the bike for about 30 to 40 miles on flat ground; warm-up in the pool and go home.

Saturday: Warm-up on the bicycle and go home; warm-up in the pool and go home.

For the power jams, you want to do something that will be sustained for relatively shorter distances to develop both speed and power and others for much longer distances for more sustained power efforts. You need to mix these up as your training and competition tell you where you need to improve the most.

The reason for the warm-up and go home for swimming on Wednesday and Friday is because there is quite a bit of fitness development for the upper body generated by the cycling which will replace some of the easy to moderate workout for swimming on those days. Remember, we have to use cross training principles to prevent overtraining and maximize recovery.

The reason for using cycling for the easy to moderate days (Monday, Wednesday, Friday, and Saturday) is because, compared to running, cycling lengthens the muscle cells and causes the muscles to be a little looser. This slightly increases the blood flow through the muscles and increases the rate of recovery. Running actually shortens the muscles cells in relation to cycling and causes the muscles to feel tighter. The best relaxation to increase recovery would be the cycling.

The shorter running anaerobic program should be on Tuesday to increase your recovery from Sunday's workout. The longer cycling workout should be on Thursday for carb loading purposes. See the Chapter on Carb Loading.

Now you can modify this program to your fitness level.

If you are presently doing half the distance of this program for your aerobic day (Sunday), cut the distances for Sunday, Tuesday, and Thursday in half and back Wednesday and Friday off by about 30% to 40%.



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Part III • Chapter Twelve

Training for Recreational Cycling

Training For Recreational Cycling

The first and most important thing you must do before designing a training program for recreational cycling is the same thing you must do before designing a program for racing. You have to answer the question:

"What do I want from my sport?"

What you want out of the sport will determine what you have to put into the sport. This is because you can only get out of it what you put into it.

For simplicity's sake, I will put recreational cyclists in three groups. These will be the casual cyclist who does less than 20 miles per ride, the intermediate cyclist who does from 20 to 50 miles per ride, and the serious cyclist who does from 50 to over 100 miles in one ride.

The latter group will include riders who do multiple day rides. I'll talk about things in the earlier classifications that all of you should pay attention to, such as spinning which will be discussed in the casual group.

Casual Cyclist

Most casual cyclists go out for very short and relatively slow pleasure rides, often with a spouse. Some only ride on weekends while others may ride every day.

The two most important things which I wish to state here is that for minimum basic fitness, you should ride at least two to three times per week

for at least half an hour to one hour. The minimum should be something like Sunday, Tuesday, and Thursday.

You can move these days around to fit your life style such as Saturday, Monday, and Thursday or Sunday, Wednesday, and Friday. Any three days spread out during the week are fine and the minimum. You can easily add in another day or two any time you want such as also riding on Saturday.

The most common mistake made in cycling and especially among casual cyclists is to use too big of a gear. I always see them plodding along with very slow leg movement. Everyone needs to learn to spin.

Spinning is very good for increasing your aerobic fitness development for several reasons. First, we have what we call the muscle pump. When you contract a muscle, the muscle cells shorten and get fatter. When the muscle cells get fatter, they put pressure on the surrounding blood vessels forcing the blood out of them and towards the heart in a forward direction. This accelerates the flow of blood through the body while decreasing the workload on the heart, **IF THE CONTRACTIONS ARE SHORT AND FAST.**

If the contractions are significantly longer, they cause a backpressure against the heart forcing the heart to work harder and slowing the blood flow through the body. This backpressure is OK for the short distances a racer may need to jump or chase (up to a few miles) but work against you for the longer distances.

Second, it is easier to control your speed and keep it smooth and steady when you spin. I hate riding in a paceline with a recreational cyclist who has it in his head (it is almost always men) that pushing a big gear is better.

They can't properly feel their speed and don't realize how much they vary their speed. Their speed varies with almost every push of the pedals and it is like riding in an accordion, which is why we call it the accordion effect in

racing. They are constantly slowing and accelerating and don't know it. Riding behind them is a nightmare because it beats your legs up very quickly.

In a race, a seasoned veteran will refuse to ride in a break with someone who can't keep a smooth pace because the constant slowing and accelerating hammers your legs. They will either slide out the back knowing that you will bring yourself back to them by prematurely fatiguing your legs or force you out of the break telling you to not come back.

Spinning makes it much easier to keep the smooth, steady pace require for good aerobic conditioning. It will also improve your bike control. See my chapter on Riding Discipline.

Intermediate Cyclist

This is where you really need to start having at least some form of structure to your riding. This is to make sure that you get the most from your riding without overdoing it in some way. You should ride at least three to four days per week using my training structure for racers.

Let's say that you don't ride more than about 30 miles in one ride as an example. I would do from 10 to 30 miles on Sunday, Tuesday, and Thursday or some variation of that schedule. If I rode on Saturday, it would be only about 10 miles easy spinning to loosen my legs up for Sunday's ride.

If you want to ride 40 to 50 mile rides, you should ride at least 4 to 5 times per week. Pay attention to my discussion on spinning in the casual cyclist section above. I will also include a section on preparing for a special ride following the serious cyclists section. Also see my chapter on the Feed Zone.

Serious Cyclist

For a serious cyclist you need a minimum of four to five days per week using the program structure I set up for racers. You need to do close to the distance you like to ride in tours on a regular basis. Your most important concern will be quality of aerobic fitness development.

I would suggest a short spin on Saturday to loosen your legs up and a "long" ride on Sunday. Remember that long is a relative term. If you like 50 mile rides, as long, then you should do 30 to 60 mile rides on Sunday for your long ride.

You want more aerobic fitness than will be required by your tour so it will be easier and more fun. If you are a century rider, then you should regularly ride 80 to 120 mile rides so your tours will be easier and more fun. See the following sections for suggestions on improving the enjoyment of your ride and see spinning in the casual rider section above.

Anaerobic Training For The Recreational Cyclist

If you really want to improve your fitness and the enjoyment of your cycling, include some level of anaerobic or speed work in your rides. You only need to do two to three "efforts" two to three days per week to see a significant improvement in your riding ease and enjoyment. You don't have to do 100% on your efforts to increase your strength and riding speed. But remember that what you put into it will determine what you will get out of it.

You may want to start out by simply leaning on the pedals a little harder for 6 to 8 seconds a few times per ride and two to three rides per week. As your strength and fitness improve, you may want to lean on the pedals with more and more force until you reach a level of strength that you are happy with.

This is the same principle racers use to make their "rides" easier and more enjoyable. It doesn't have to hurt to improve your riding but don't expect the improvement to be immediate.

If you are having trouble staying with the riders you like to ride with and feel bad about holding them back, do a few "jumps" in your ride two to three rides each week. It will improve your riding a lot.

It doesn't matter whether you are a recreational cyclist or a racer, your body functions the same way in relation to exercise and rest. It will either condition or atrophy to the work load you place on it.

If you gradually increase the workload, it will condition to that workload. If you decrease the workload, it will quickly atrophy down to that workload. This is a real problem with a group of recreational cyclists I call gear chasers.

Gear Chasers

These are the people you always see regularly at the bike shops and searching through the mail order magazines trying to find a smaller chain ring (front sprocket) and a larger freewheel sprocket to make climbing easier. Their real problem is that they don't properly understand how their body works or they would not do this to themselves.

When you put that smaller gear on your bike to make climbing easier, you are decreasing the workload on your muscles and they will atrophy down to the lower workload. Within weeks, it will become just as difficult to climb the same grade in the smaller gear as it was in the larger gear simply because of the way the body functions in relation to work.

Your efforts are self-defeating.

Racers climb much faster and easier and enjoy their climbing more than you do for a very important reason. They condition their muscles so that it becomes easier to spin the same gear on the same climb and so should you. The proper solution to your problem, which will make your climbing easier and more enjoyable, is to increase your climbing strength.

You don't have to hurt to increase your climbing enjoyment. Again, it is just a matter of gradually leaning on the pedals harder over a period of weeks and months to increase your climbing strength. If you want to increase your climbing strength more quickly, you lean harder or actually even jump for short distances or on short climbs.

After I retired from racing, I got out of shape (I had to work for a living too) and started riding with others on several occasions. Both times, I would attack the hills and get dropped when I first started riding. The other riders always started telling me to learn to pace on the hills so I wouldn't get dropped.

Week after week, I made it further up the hills with my attacks until I finally made it over the top with my attacks. Then I got to wait at the top for those who only paced to make it to the top. Then climbing was easy and fun. Don't chase the gears, chase the hills and your climbing will become easier and more fun.

Basically, if you go a little harder on the flats, your flat speed will increase. If you go a little harder on the hills, your climbing speed will increase. All you need is a few times each ride for no more than two to three rides per week.

It will make a huge difference in your riding and riding enjoyment. It works.

Ride Preparation

It never fails, every year I get racers contacting me anywhere from two to six weeks before a significant event asking me to give them a program to prepare for the event. The truth is, that for racing, they should have started preparing for that event a year before the event.

In recreational cycling it is not quite as severe unless you are a real achiever like a century, double century, or other high achievement rider. Most of you can get away with starting your preparations for an event as little as three to six months before the event. That is, if the event is not too demanding in relation to your basic fitness level.

The way you do it is to look at where your aerobic fitness level is and where you need to be for the event. Using my weekly training program as far as miles per day, gradually increase your mileages for your longer rides every week until you are doing 10% to 20% more miles than the ride will require.

As an example, let's say I am riding 50 miles per day and in six months I want to do a century ride. For simplicity's sake, we will say each month has 4 weeks. Therefore, I want to increase my Sunday ride 70 miles in about 22 weeks so that I will be doing rides of 120 miles for the two weeks before my ride. That way, your 100-mile tour will be easier and more fun.

You only have to write an increase of 3 to 4 miles for your Sunday ride each week on your training calendar (just use a regular wall calendar or my training calendar in this book.) The increase will be gradual enough that you will barely notice it and you will feel that your tour is easy and have much more fun.

If your tour or road trip is going to include more climbing than you are used to or you will need to climb faster to stay with the group, do the anaerobic

workouts I mentioned above by "jumping" on some short hills two to three rides each week.

You will be amazed at how much better you will climb. If you need to increase your flat speed, do some jumps on the flats. It works.

Enjoy your ride.



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Part III • Chapter Thirteen

Too Old?

Too Old?

This chapter is in response to the question I get all the time and that is:

"Am I too old to start racing?"

What I want to do is help you to analyze bike racing and age, and then let you answer that question for yourself.

First, we know that the average person loses approximately one percent of their muscle mass by the time they are about 50 years of age which means that they don't have more than about 99% of their maximum strength potential of when they were in their early to mid 20's. That is on the negative side. On the positive side, we know that you can keep increasing your aerobic development long into life depending on when you get close to your top aerobic potential.

Next, we know that no athlete has ever gotten within 10% of their maximum physiological potential which is a lot when one considers that there is less than one per cent fitness between the top pro's in Europe. Plus, we know that if you are drafting single file behind a rider of your own size, you are doing 30% less work than the rider in front of you at just 25 miles per hour (40kph.) In a pack, the difference is even greater.

Other benefits to aging are experience and increased maturity which permits a rider to be more relaxed, clear headed, rational, and logical in a race.

Put all these things together and it should be obvious that the 1% loss in muscle mass can more than easily be made up with continued aerobic development and strategic adaptation.

Over the years, I have seen plenty of examples proving this but have unfortunately not kept a record of names so please excuse me for not having the names of the individuals I will refer to.

I first became aware of the over emphasis and myth of aging concerning sports when I read the book "Aerobics" in the early 1970's. I have not seen, read, or talked about the book in about 25 years but I believe the author was Kenney, PhD.

In the book, the author told about a man who had a heart by-pass in his mid to late 50's and was sent to the author for rehabilitation through fitness development. It turned out that the elderly gentleman had never been in sports, knew nothing about sports, and was starting in the hole as far as fitness development.

By the time the heart patient had been working with the author about 5 to 6 years, he had obtained enough fitness to where he was racing bicycles and consistently placing against the top Senior Class riders.

A few years later, I read an article in a cycling magazine about a problem they were having with older riders in Europe. It seems that, at that time, the UCI didn't permit anyone over 80 years of age to race in UCI Masters events. So there were a lot of riders who were as much as over 100 years of age lying about their age to get into road races of from 50 to 100 miles.

My favorite example is a guy I saw racing on a regular basis out of San Diego, California, USA in the 1980's. I was informed that he had had a multiple heart bypass in his mid to late 50's and was put on an aerobic training program. He was starting from scratch, as an athlete at almost 60 years of age after heart surgery because he had never been involved in

sports, knew nothing about exercise physiology, and had no motor skills development or intellectual experience from sports.

When I last saw him race in about 1990, he finished in the top five in a break against a number of pro riders, at 71 years of age.

I love racing in Mexico against the older riders because they are so much more mature and use really great team tactics. I have met a number of other racers I raced against over 30 years ago who are still going at it including one old guy who is 72, was Professional National Road Champion of Mexico on the Pepsi Pro Team about 30 years ago, and is still kicking butt against the younger 30+ Masters.

They have been around so long and seen so much that their team tactics are very good and force you to think while racing. I absolutely love it.

I personally believe that bike racing might very well be the best lifetime sport in the world. I have seen a lot of evidence that you can keep racing competitively until any where from 70 to over 100 years of age.

I have learned from plenty of others that, at 50, in cycling, you are still a kid. To my joy, a friend and racer in Juarez, Mexico who was over 70 recently called me a kid, and I was over 50 at the time. It sounded good.

So regardless your age, just keep stomping those pedals.



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Part III • Chapter Fourteen

The Yellow Jersey Road

The Yellow Jersey Road

This chapter is designed for two purposes. The first is to let you know about the true life style of most racers who reach for the stars and teach some of the tricks for surviving that life style.

Second, is to provide you with a realistic perspective of what you may face should you decide to travel this road to better help you decide whether it is the road for you. It isn't all as pretty as the media make it look. It can get spirit-breaking tough. For most, it is a very hard road and it takes a very special type of person to travel this road.

This comes from one who has traveled this road as an athlete and watched many others do it while coaching. I will include ideas, tips, and advice for helping you survive the road as best as possible should you decide to travel it. It is not just for those aspiring to reach the Tour de France but for all aspiring riders.

This chapter is the result of a request for help from a struggling, aspiring cyclist and I wish him and those of you that choose this lifestyle all the best.

Economics of Racing

It is unfortunate, but money is the single most common limiting factor in sports. More athletes never get a chance to achieve their goals or dreams because of a lack of adequate funding than any other reason.

The group of athletes who tend to go the furthest, are the athletes who's parents have the money and are willing to support the efforts of the aspiring athlete long enough for them to have a reasonable chance of achieving their goals.

So, if you can get born to rich and understanding parents, you have the best chance at excelling.

Unfortunately, most of us are not born into such families. It is true that more are born into such families today than even 20 years ago and the situation has improved considerably over the last thirty years. I started racing under the "rule" of Avery Brundage who firmly believed that athletes should not be permitted any financial assistance for sports.

We were not permitted to have sponsors and could not win prizes worth more than \$50 retail value. We used to win almost nothing but junk when there were prizes at all. The middle and lower classes were financially ostracized from sports.

Today, cycling has improved a lot but still needs to improve a lot more. Our centralized coaching and teams systems provide good support for a few of those riders who manage to make it to the top. The rest of the top athletes and all of the intermediate athletes are left to fend for themselves. We call those masses the starving athletes.

One must ask, "What good does it do to provide financial support for upper level athletes if most of our potential upper level athletes don't have the opportunity to make it there?"

We are throwing away most of our best potential talent. How many more Greg LeMond's and Lance Armstrong's could we have had if the national program were decentralized to provide better support for **ALL** intermediate to upper level racers who wish to go pro?

The two best things we can do to help solve this problem would be decentralize the national program and establish a multi layered major and minor league program. The first will open up the local programs for increased sponsorship moneys. The second will strongly encourage more sponsors at all levels of the economy to enter the sport as team sponsors.

Racer Economics

The average athlete, whose parents either cannot or will not support the athletic endeavors of their child, faces an economic dilemma, which is; how do you obtain the finances required for living and racing while still being able to train and race?

Several problems make this particularly difficult for the cyclist. First, any job where the athlete has to do a lot of standing, walking, and, especially, climbing cannot recover properly from his workouts. The most imaginative programming can help with this problem only up to a point. For a rider to be competitive beyond that point, his legs must get enough rest to recover properly before the next training ride.

Second, reasonably safe training requires daylight hours for riding the bike. Working normal 8 to 5 hours makes this impossible during the winter months. Some of the solutions I have seen for these problems over the last 30 years involve innovative economics. First, the athlete is often required to live in a state of poverty or near poverty on a very strict budget just to make it. They normally have to rent a very inexpensive apartment in a low rent, high crime area.

A solution to this is to share the rent on a better apartment or house with one or more other racers. But this also has its limitations. First, you may not be compatible with all of these racers for very long. People have different living habits and some people will take advantage of others. Then there is

the problem of one or more of your roommates leaving and your rent increasing.

A potential solution for this is for a club to own one or more houses it can rent to promising riders for a reasonable fee. This can stabilize the situation considerably with proper management and reasonable house rules and can also provide financial opportunities for the club. It would permit the club to use money that would normally go to a landlord to increase the club revenues and, therefore, the programs and athletes they can help. The athletes would have to pay a much higher rent anyway. You might as well put at least some of the money back into the club.

Then there is the matter of a job. Most aspiring racers are often required to take what they can find. Unfortunately, most of these jobs require the athlete doing a lot of standing, walking, and climbing. The boss doesn't care about your dreams or your needs as an athlete. These are also usually low-income jobs.

I would like to suggest that clubs try to make arrangements with a temporary employment service to provide the athletes with favorable employment such as night or evening jobs where the athletes' legs can get as much rest as possible.

Economic Priorities

There is a belief in the cycling community that the most important investment for an athlete is his racing equipment. I am about to shatter this myth.

I want you to go the races and watch something. Look at the middle and back of the pack and see all of the racers who are riding thousands of dollars worth of the latest and most advanced equipment. If you watch these racers, you will see that most of them will never win a race even if they race

10 to 15 years. Obviously, it isn't because they don't have the equipment to win.

The average American amateur who will never win a race is much better equipped than the Average European pro. Do you believe the average American amateur can beat the average European pro? I know they can't. But they have the equipment to win, don't they?

Then there must be something more important than equipment. To find out what that would be, we must answer the question, "Why do these very well equipped racers keep losing all their races?" The answer is simple. They don't know how to train and race properly. What good does the equipment do without the professional training to use it?

Where would the racer be better off putting his money? It should be obvious, professional coaching. When I was coaching, I noticed something very interesting. Almost all amateurs place very little value on coaching and are not willing to pay much if anything for it while the pros were going around looking for a better coach.

The best riders were spending more time looking for better coaching than for better equipment. As a matter of fact, they would ride any pro bike you gave them. Some pros feel that coaching is so important for their future that I was told by a number of pros that they would ride for me for half as much money as any other coach. They made it very clear to me that they considered it as important as money.

A word of warning here though: You have probably heard it said that a bad coach is better than no coach. I strongly disagree with this.

Over the last 35+ years in cycling, I have seen thousands of dreams dashed by bad coaching. An example of this are the riders I have been working with

through my Internet personal coaching program. Almost every one of them has come to me overtrained.

An overtrained rider will go flat and stop progressing. If their overtraining gets bad enough, they will actually regress. I have seen very few cycling coaches who don't overtrain their athletes enough to limit their athletic potential.

If you have a coach and you stop progressing, it is not because of your genetics; particularly at the mid to lower levels in cycling. Exercise physiology has taught us that the average human body is capable of at least professional domestique level of competition. If you have been trying to move up in racing, training for at least 8 to 10 years, and you have not reached that level, you are training wrong. Get a coach who can get you there.

It is important to state here that decentralization of the national coaching and teams programs would increase the sponsorships for local teams. This would increase these teams' abilities to hire better coaching for all their athletes. We need better coaching from top to bottom and not just at the top. This is one of the main reasons I wrote this book.

Making All The Right Sacrifices!

What I want to do with this chapter is discuss the sacrifices, which have to be made by someone going for the top or pro sports. Then you look those sacrifices over and decide which ones you are willing to make. That will give you an idea of how much you want it and how high to set your goals.

The question you need to ask yourself at the end of this chapter is, "How much is it worth it to me?"

The sacrifices I will discuss will be for a teenager who has decided he wants to win the Tour de France. What I want to do is look at it from the aspect that I am the teenager so that it is my dream and I have the benefit of my present decades of experience in racing and coaching to help me make that decision. I guess you could say that I just got a second chance to be a teenager and get to know what I presently know at 54 years of age.

First, we have to look at what is required to get there. These include professional coaching, proper training and rest, make the right races, a good racing team, travel, equipment, finances, proper diet, strategic and tactical guidance, and the right mental situation.

I will look at this from two aspects. First; I want everything I can get which will benefit me and second; I want nothing that could possibly interfere with my chances of getting there. Bottom line? I want the best possible chance for succeeding.

Training

I want and need the best possible training program for each and every fitness level as I progress through those fitness levels. I want something that is going to keep me progressing and not put me into overtraining, which would stop my career until I change my training program and recover from the overtraining.

This means that I would want the best coaching I could get to program my training and make the appropriate adjustments to my training as my fitness changes. My short-term goal would be to keep developing and learning as fast as possible with my long-term goal being going from category 5 to the best in the world as quickly as possible.

Therefore, growth and development, both physically and mentally, are my most important concerns. That requires coaching and direction.

I need to make sure that **NOTHING** interferes with my development. This means that I must be able to train and race when I need to and rest when I need to. The latter is all too often forgotten. I need financial support which means that I don't have to stand on my legs all day, I don't spend late nights at parties, especially before races, and don't do anything which will interfere with my body's ability to rest and recover.

This means that when I want to go to a party the night before the race, I ask myself which is more important to me and what I want for my future. I must do this for everything in my life.

When my road has been traveled and I look back over it, will I be glad or sorry for what I do today? Am I willing to sacrifice any pleasure for the pleasure of living my dream?

If not, I probably won't achieve my dream and this is where most people fall short. **You MUST have the same focus on your dream that a sprinter has on the finish line.** Intense, unrelenting, and unwavering. You must take the best possible care of your body and mind for its maximum potential development.

Finances

Of course the best financial situation is to be born to the right parents who both can and will support my efforts for the entire 8 plus years it will take for me to make it well enough in pro racing to begin making my living from the racing itself. But few of us have these parents; therefore, I must consider other options.

Two other options would be a job, which will present the least conflict with my dream and minor league pro racing. Unfortunately, the minor league pro racing must exist as is the case in Europe, and I have to make it long

enough to break into minor league pro racing. Therefore, the first step will be for me to find a job which will least interfere with my racing.

Two things I will look for are a job, which will not tire my legs with too much standing, walking, or climbing, and a job which will permit me to have daylight hours for training. So I will look for a job where I can sit as much as possible and a night job like a security guard desk job or maybe a computer job working evenings.

Some major companies actually help athletes obtain training friendly jobs. This is particularly true in Europe. I knew a minor league pro from Germany who had a nice desk job 20 hours a week and was paid to race for the company team the other 20 hours a week. These kinds of jobs are easier with minor league pro racing because medium to small businesses who cannot afford a national level pro team can sponsor a local pro team if the riders work some to help out the company.

Unfortunately, most countries have not thought of even trying the minor league pro system that has made Europe so dominant in cycling and a rider has to work full time to pay bills until he can get good enough to make a pro team. This doesn't help the athletes as well as the minor league pro system and fewer potential champions will make it to the pro level. Finances are the single biggest problem faced by aspiring athletes around the world.

You can help defray some of your racing expenses by getting some kind of equipment sponsorship as soon as possible. Another thing you can do is get over the equipment thing and just start out on a decent bike until you reach the level where you can get sponsorship.

I saw this system used very well in Mexico when I first started racing. The beginning racers were always given the worn out junker bikes to learn on. They often raced on stuff like Sears ten speeds while being watched by the teams. As a rider improved and showed promise, they were given better and

better but still used bikes. In this way, they earned the right to ride a new pro bike. It is a cheap way to learn bike racing and develop fitness.

At the start, that should be your most significant goal anyway. It doesn't matter what bike a beginner trains on and learns on as long as he trains and learns.

A little marketing secret here is that, when you get good enough to place on your junker bike, the bike companies or shops will make sure you get on a good bike as soon as possible because they don't want you beating their new stuff on junk. It really hurts bike sales. If you can't afford the best stuff, do the best you can on what you can get. If you get to where you can compete against the best stuff on your junker, you will get the best stuff. No maybe's.

This may mean taking hand-me-down or used equipment and clothes to achieve your dreams. It means sacrificing pride, which can be tough. But which is more important, a pride that will be quickly forgotten about or winning pro races which will be remembered longer?

Note: If people laugh at your junker, they will stop laughing when your junker beats their super bikes. He, who laughs last, laughs best.

Diet is one area where you may have to make sacrifices. You may not be able to afford eating out. This means learning to cook. You can start this by getting a good general cookbook, which will teach you the basics to cooking all kinds of food.

Do some reading into basic diet, which you should be able to get help from a public school or government. Stick to the basics such as beans, corn, rice, and meats. Learn to cook large family meals to save on costs and freeze leftovers for future meals. It is also important to understand that some

things will be less expensive purchased cooked than cooked at home. You will have to figure this out by budgeting and budget analysis.

Social Sacrifices

This is the area where most people fail the test. We all want to have lots of friends and be social. As humans, we are a social animal.

But you can be social without sacrificing your dreams. Learn to make your cycling friends who are as serious as you your social circle. It will help you make the right sacrifices. You can often share housing and travel to save money and give each other moral support.

If you make party people your social circle, they will not understand you and support your dreams. They will tend to get you to compromise your dream to party with them. Who you choose as your friends often determines your chances of success. This is particularly true if you are more often persuaded than the persuader.

Marriage and dating destroy more dreams than anything else I have seen short of finances. You have to understand that it is incredibly rare to find a person who will make all the right sacrifices for the years it will take to achieve big dreams for their own dreams.

It is even more rare to find a person who will make those same sacrifices for someone else's dreams.

The latter is probably on the scale of less than one in a quarter of a million people. I have known, maybe, only one or two such people in 45 years of sports. Your chances of finding one in the first 5 to 6 years of pursuing your dreams is almost zero.

Most people will promise to support the pursuit of your dreams but very few will deliver. I strongly recommend refraining from serious dating or marriage until you are at least making a decent living from your dream or are ready to give it up. That is the safest way to approach it.

Over the last 40+ years, I have watched too many people pressure and manipulate their fiancé or spouse into giving up a dream before they were ready to give it up. That is always a disaster for the dreamer.

You can tell a champion by his sacrifices!

Life Style

In this chapter I want to show the ideal life style for my young, aspiring professional racer to be (myself.) In other words, what kind of life style must he live to have the best possible chance of achieving his goals.

Then you have to decide which parts of this life you can or are willing to accept to achieve your goals. This will also help you realize how much you really want from your sport, whether cycling or any other sport. This concept can also help a person decide how much they want any dream such as business, music, dance, or others.

To achieve the dream, you must live for the dream.

My primary focus and entire life style must be built around achieving my dream. Everything else must come second or less to my dream. Therefore, everything else must be built around my ideal training, racing, and recovery.

Nothing can be permitted to interfere with those things in my life. If something does interfere, I must return or recover to those three things in my life as soon as possible. The more interference I permit, the less likely I am to achieve my dream.

You must also know that you can achieve your dream with some interference if you build it into your program. It just makes it more difficult to achieve your dream. In other words, don't give up on your dream just because you don't have the ideal life style.

It may take you longer to get there, it may be tougher to get there, and it may be less likely you will get there, but you may still be able to get there if you can design your life style right or as close to right as possible.

When you start making enough money from your dream, it makes it easier to live the ideal life style. This is one of the reasons why I strongly support minor league professional bicycle racing. It is the one thing, which can make the difference between more athletes being able to achieve their dream, or not.

One of the main concepts I have to use is that I must protect my legs and the rest of my body from the wrong things in my life style as much as possible. In other words, in my work, I want a job, which will tire my legs as little as possible, which should mean as much sitting as I can do. The same goes for my play and other spare time activities. This means I want to spend as little time as possible walking around shopping malls, standing at parties, or standing in some video arcade.

The best way to achieve this goal is to get a job sitting as much as possible even if it means taking a decrease in pay and living more modestly. I need to make my training and racing my recreation and fun for as much as I can. It is what I live for. The rest of my spare time should be with such activities as reading, watching TV (a real drag most of the time), playing video games on the couch, working on a computer, drawing, playing a musical instrument I can sit with, playing parlor games, or any other activity which will permit my legs to rest as much as possible between workouts.

You have to understand that the muscle cells are either working as in standing, walking, or climbing or they are resting. They cannot do both. You have to design your daily activities so that your legs will be as rested and recovered as possible for the next ride you do whether training or racing. You have to be able to make what most people consider a boring life to be as interesting as possible.

This is why dating should be out until you are at least making a decent living from your dream. It is also why almost all pros retire as young as they do. They and/or their spouse reach a point where they cannot endure this life style any more because they begin wanting to enjoy other things in life and begin to compromise the life style. They no longer love only the sport and the life, which must go with it.

The ideal life style must not only include what you do to your body externally but also internally. What do you put in your body, which does cell damage like recreational drugs including alcohol and tobacco? The more cells you damage with the drugs you use, the fewer cells you have to help you achieve your dream. Why would you want to shortchange your dream?

Your greatest pleasure must be riding the bike. You must want to ride the bike all of the time and this can require some psychology.

I used to make my most aspiring riders take just enough time off the bike and only permitted them to do just enough races to keep them hungry for more. I never permitted them to achieve a point of having ridden enough races to be satisfied and not wanting to do another race or ride. I "starved" their minds just enough to make them want more riding, whether racing or training.

If I saw a rider was reaching a point to where they were becoming satisfied with riding, I made them take time off until they really couldn't wait to ride again. I made them miss riding almost every hour they were off the bike.

Reading cycling magazines and watching videos can help this. Also sitting around with cycling friends talking racing is a big help. This is why your best friends need to be other cycling "nuts" who understand and want the same dream. The mind is the single most important key to your dream and will do more to unlock the doors leading to success.

For me to have the best possible chance of achieving my dream of becoming a great professional bicycle racer and winning the Tour de France, I must eat, sleep, and dream bicycle. If you don't really love it, you can't really succeed at it.

How much you love it will determine your chances of succeeding at it.

You must love your dream more than friends or anything else. You must be married to your dream and be on a long honeymoon with it.



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Part III • Chapter Fifteen

Carbohydrate Loading

Carbohydrate Loading

There are both pre and post race carbohydrate loading. The purpose for carbohydrate loading is to provide the maximum supply of carbohydrates within the body during a given period of time to meet the increased fuel needs of the body for special reasons.

Pre-Race Carbohydrate Loading

The purpose for pre-race carbohydrate loading is to force the human body to store extra carbohydrates for an athletic event, which requires large amounts of carbohydrates as fuel. It is normally done for events that are two hours or longer in duration.

So, how do we get the body to store more sugar than it normally does? Remember the principle of training effect (also known as overload training) which states that, if the body is stressed it will rebuild to a higher level so that if the same stress level occurs again, your body will handle it easier with less damage? It also applies to energy storage.

If you seriously deplete your body sugar levels and then consume large amounts of sugars and starches for about one to two days, your body will process and store more sugar than normal for up to three days after your last long workout.

The proper technique is to go for a long ride two to three days before your event. (Carbohydrate loading works best if started three days before your event.) Then you eat meals and snacks with large amounts of sugars and

starches up until the night before the event. The workouts between the last long ride and your event must be shorter and easy to moderate or it won't work as well. Hmmmm, I wonder why Coach Carl has the second longest ride of the week three days before race day with two easy to moderate days separating the second longest ride from race day? :-) Think about it. I have at least one reason for everything I do. It works.

Post Race Recovery

The reason I call this post race recovery instead of post race carbohydrate loading is because there is much more that must be done to increase your rate of recovery from an event than just carbohydrate loading.

During a prolonged athletic event, your body will become dehydrated, hypoglycemic, and short on electrolytes. We must meet these needs in the proper order based on science.

Dehydration causes your blood and cells to become more viscous or thicker because of the decrease in water content. This increased viscosity makes your blood and cell cytoplasm move more slowly which decreases body functions and, if slowed enough, will stop cell functions in enough of the right cells causing death of the human.

Increased viscosity also causes increased stress on the heart and circulatory system. All of this slows the recovery process which means that hydration of the body should be the most significant step in helping the body recover faster.

The second most important compound we need following a sustained athletic event is sugar. Sugar is used by the body as fuel. It is used for both activity and normal metabolic functions. If your body is short on fuel, it must use most or all of that fuel for life functions and won't have the fuel required to (1) rebuild the body and (2) rebuild your fuel stores.

Finally, for events of about 1 1/2 hours or longer, your body will need to replenish electrolytes to help maintain a proper fluid balance in your body. This loss is not as crucial to the body for immediate recovery as water or sugar.

Another principle we have to consider in making this decision is diffusion of matter from the stomach into the circulatory system. Pure water diffuses into the circulatory system faster than water with anything else in it. You also have to know that water with sugar diffuses faster than water with electrolytes.

Finally, we must consider part of the body's cooling system, which is the epidermis or skin. To cool yourself, your body excretes electrolytes through pores in the skin. These electrolytes help draw water through the skin faster to cool the body more quickly through evaporation. The salts remain on the skin following the event and continue to draw water through the skin or to dehydrate the body more quickly.

The Process

An athlete has just finished a race and you need to go into action to get his body to recover as quickly as possible. (You may be this athlete.) This is especially true for multistage events. How do you do it and why?

The first thing you need to do is to hand the athlete a drink of cool to cold water and a wet (very wet) cloth or sponge. The fluids are for re-hydration and to decrease your body core temperature to decrease the fuel and water losses for cooling purposes.

The wet cloth or sponge both removes electrolytes from the skin and adds water to the skin to cool it and indirectly cool your core temperature more

quickly. (I hope you understand that you don't hand an athlete a wet cloth or sponge if it is too cool or cold outside. Use your head.)

The athlete should drink nothing but water for about 15 to 30 minutes following the event to maximize re-hydration of the body. This permits the water to empty from the stomach into the circulatory system as quickly as possible. It can take the body 24 to over 36 hours to recover completely from serious dehydration but you must start it moving that way as quickly as possible.

The faster you begin the hydration process, the faster the cells can recover from the damage you have done to them.

You want to follow the water with sugars while continuing the water. Soda pop is a good thing for this. Caution: Make sure you give your contribution to the golden flow before you begin guzzling soda with caffeine. I personally feel there is nothing that feels as refreshing after a long hot race as a cold cola.

You want to start with simple sugars to maximize the bodies absorption of the sugars to quickly increase the sugar content of your blood and cells. This provides a burst of energy to get the cells started towards recovery sooner.

You follow the sugars with electrolytes. You don't need excessive amounts of electrolytes because you can over do electrolytes. Your body stores very little in the way of extra electrolytes. Any excess is filtered out through the kidneys into the bladder. If you consume too many electrolytes, the electrolytic content of the bladder will increase to where the electrolytes begin to draw excessive amounts of water across the kidneys. This dehydrates the body and stresses the kidneys, bladder, and prostate gland.

I had an athlete come to my team from another team and his performance

had begun to fall off. By the time I found out what was going on, he was consuming from six to eight 2 liter bottles of Gatorade per day. He had been taught to believe that he could not consume too much in electrolytes and was drawing so much extra water into his bladder that he had stretched or distended his bladder to where he could urinate more than two liters in one urination. A pint is normal.

He had been a very good road racer who could easily handle a four to five hour race on a hot day. By the time he was consuming twelve to sixteen liters of Gatorade per day, he would drop out of races after only 30 minutes from dehydration and heat exhaustion. He was on the verge of killing himself. The long-term effects of this kind of behavior can cause severe damage from dehydration, heat exhaustion, and kidney problems, a ruptured bladder, and prostate failure.

How much is enough with electrolytes? Take a good electrolytic fluid like Gatorade and cut it 50/50 with water. Of this diluted solution, take from 4 to 6 fluid ounces per half hour of competition. Less for a cool, dry day and more for a hot, humid day. For a two-hour race on a cool, dry day, you should consume about 16 fluid ounces of the dilute solution. On a hot, humid day, use about 24 fluid ounces of the dilute (or half as much of undiluted electrolytic fluids.)

What size of person? The above would be for an average size male. A smaller person should use a little less and a larger person should consume a little more. This is close enough to meet your needs and not cause problems. Just don't down tons of the stuff.

After consuming your electrolytes, your stomach should be settled down enough to start taking in solids. Start snacking on something with some complex carbohydrates like starches. You know, breads, pasta, and such.

You need to do carbohydrate loading until your next hard ride on Tuesday or Thursday; depending on how much rest you need after the event.

This system will help your body maximize its recovery from an event. Beyond this, it depends on how fit your body is.

Therefore, long-term fitness development is your best strategy for post event recovery. It works.



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Part III • Chapter Sixteen

Feed Zone

Feed Zone

In this chapter, I want to cover feeding during the race and the normal diet. We are going to use common sense science to kill a few nutritional myths.

Race Food

First, we need to look at the biological needs of the body during the race. We need to meet those needs because they are what will most effect your performance and, potentially, your health. Everything else should be dealt with between the races.

During a bicycle road race the body is consuming a lot of water and sugar. It will also deplete some of your electrolyte stores. The electrolyte stores can and should be dealt with between races as described in my chapter on carbohydrate loading unless you are doing an ultra long race of 12 hours or longer. Therefore, our biggest concerns during the race are water and sugar.

Sugar

At a steady pace of 24 miles per hour on flat ground, with no wind blowing, 75 degrees Fahrenheit, and about 70% to 80% humidity, the average male cyclist (about 5'10" and 150 pounds) will burn 1,200 calories per hour.

Of course, increasing speed, adding hills, varying pace, changing the temperature by at least 10 degrees, adding wind, increasing humidity, and increasing the size of the cyclist will all increase caloric consumption.

Under the aforementioned conditions, the average male will burn 5,000 calories for a 100-mile ride. Changing those conditions can easily cause your caloric consumption to soar to over 6,000 calories for a 100-mile ride in the mountains.

This is a huge caloric consumption when you consider that the average sedate American only burns 1,500 to 2,000 calories per 24-hour period of time and that a chocolate layer cake with the icing only has 4,850 calories. Don't you just love bike racing!

Confession: One of the reasons I love road racing is because I love eating.

It should be obvious that we need to consume sugar during our longer races. It doesn't hurt to carry a candy bar into a fifty-mile Criterium to give you some extra sugar by eating it about 30 to 45 minutes before the finish. Anything longer than 50 miles should require some kind of carbohydrates being ingested.

Over the last 35+ years, I have seen many arguments about whether to eat complex or simple sugars. Here is our first myth buster:

All carbohydrates must be broken down into simple sugars before they will be small enough to diffuse through the walls of the digestive tract into the blood. Our bodies do not burn starches. They first break these starches down into simple sugars, which diffuse into the blood and are burned by the cells.

The big difference between simple and complex carbohydrates is how long it takes for them to get into the blood. The complex carbohydrates have to first be broken down into simple sugars before they can diffuse into the blood stream. The complex carbohydrate molecules are too large to diffuse through the walls of the digestive tract into the blood. The simple sugars you

ingest require less time to diffuse into the body. Knowing this clears up 95% of the argument. All we are really talking about is a difference in time.

Myth number 2: Years ago some PhD's did a study that showed that a person ingesting simple sugar got a sugar spike in their blood which caused a sudden burning and depletion of sugar followed by a sudden drop in blood sugar. People became paranoid about consuming simple sugar during competition.

This did not make sense to me for the following reason. During exercise, the rate of blood flow through every part of the body increases. Since the blood is passing much more quickly by the cells where the sugars diffuse into the blood, it is only common sense that the sugar will be spread throughout a greater volume of blood in the same period of time.

Add to this that the metabolic rate of the cells has increased and the body is burning more sugar in the same period of time and you should realize that all you will do is temporarily increase your sugar blood level back to a more normal level more quickly.

More recent research has proved this and disproved the idea of a sugar spike. Basically, what they have found is that, if you have been exercising continuously for at least five to 10 minutes, you will not get a sugar spike.

With this out of the way, you quickly realize that there is strategic potential for the time difference between the diffusion rates for simple and complex carbohydrates. If you want the sugar to diffuse into your system at a slower and steadier rate, you eat complex sugars. If you need a quick burst of energy, you eat simple sugars. That should be common sense. As a matter of fact, the European pros have carried and used both simple and complex sugars for their longer races for decades.

When would you eat simple sugars? Half an hour or so before the end of a race to make sure your sugar blood level is up to par. If you have been jamming hard for a while and have not had the opportunity to eat enough, you would eat a candy bar followed by complex carbs to help you play catch up and prevent bonk. The candy bar will put a little extra sugar in the blood to burn while your body is starting to break down the complex carbs. Or just anytime you may feel that you need a little extra quick sugar to burn.

When would you not eat complex carbs? When you don't have time for the complex sugars to break down and diffuse into the body. Races shorter than 50 miles would be a good example or in the last hour of a race.

Sandwiches

In the longer races and especially for stage races with longer stages, European pros carry and eat sandwiches. Some US riders like to mimic the European pros and eat sandwiches in road stages for US stage races.

Why do the European pro's eat sandwiches in races? This is done for a combination of two reasons. First, they eat sandwiches in their much longer road stages that are often anywhere from 100 to over 150 miles. Second, they start their pro races after nine o'clock in the morning so that a six-hour race or stage will last until well after lunchtime. They have to eat lunch during the race so they won't be short a meal going into the next day's race.

Our stages are much shorter and start earlier. If you eat sandwiches in our road stages, you will still have most of those sandwiches sitting hard on your stomach at the finish. Why is this important? You are going to need more water and simple sugars for a shorter race. The meats, cheeses, and cellulose from the veggies will still be sitting around in your stomach. This extra material is going to absorb some of your sugar and water slowing the rate of absorption plus slowing the rate of diffusion itself.

What you need to eat during US races are more easily digestible carbs such as fruits, breads, candy and sweet drinks. The most commonly used are bananas, some fruit cookies, candy bars, and soda pop. You do have to be careful not to eat too much of this stuff within too short of a period of time or you can get a sweet stomach. No fun.

Learn to nibble throughout the race starting within the first 15 to 20 minutes of the race.

Water

When the body becomes dehydrated, it decreases the amount of water in our blood and cells. This increases the viscosity or thickness of the blood and cells. Increasing the viscosity of the blood means that the blood will provide more resistance to the heart and flow more slowly. Therefore, the heart will have to work harder and the blood will not reach the cells as quickly decreasing the amount of nutrients reaching the cells within a given period of time. The cells will begin to fall behind in function and your performance will decrease.

Increasing the viscosity of the cells means that the molecules inside the cells will move more slowly and the cell function will decrease. Fatality or death within a cell caused by dehydration is the result of the molecular activity slowing down enough that it can no longer sustain life functions. There is a minimum rate of molecular activity for the cell to be able to sustain life functions.

Because of these problems, it is important to hydrate constantly before, during, and after a race. The best liquid for hydration during a race is plain old water for the reasons stated in the chapter about carbohydrate loading.

How much should you drink during the race? This depends on a number of factors such as temperature, humidity, wind, and workload. As temperature

increases by ten degrees above 75 degrees Fahrenheit, your rate of dehydration will also increase.

Wind increases your rate of dehydration **ESPECIALLY** when you have a tail wind, which prevents proper cooling. The body increases the rate of perspiration to increase cooling because the tail wind prevents the proper evaporation of water on your skin. If the water on your skin does not evaporate, the water absorbs the heat from the skin and then holds it there causing the body to over heat. The body increases perspiration to cause the water to increase enough to run off the skin carrying the heat away.

Most people think that you will dehydrate faster in a desert than in the Midwest or East Coast. **If the temperature is the same**, you will actually dehydrate much faster in an area of higher humidity than in an area of lower humidity such as a desert for several reasons.

First, the water molecules in the air absorb heat and keep it close to your skin. This slows or prevents the rate of heat loss from the body and increases your core temperature.

Second, air with more water molecules in it can absorb fewer water molecules and, therefore, evaporation occurs at a slower rate. For example, air with a humidity of 40% (40% of the maximum water vapor the air can hold before water begins to condense out of the air as in rain or dew) can absorb twice as much water or water at three times the rate as air with 80% humidity. Therefore, **with the temperatures being the same**, the 40% humidity will absorb water and heat from your skin at three times the rate as the 80% humidity air and cool your body at three times the rate.

The 80% humidity or higher air will absorb water so slowly that the body is forced to increase perspiration to cause the water to run off of the skin in order to keep from over heating. Because of this, you will dehydrate faster in the 80% humidity air as in the 40% humidity air.

A point of interest here has to do with this latter reason for increased dehydration in higher humidity. It is because of this that, in areas of higher humidity, people start dying when the temperature exceeds 85 degrees Fahrenheit.

Here in New Mexico we have a normal humidity of 20% to 40%. We have very little trouble with older or weaker people dying even at temperature of 105 to 110 degrees.

This should also tell you that the athlete is at a higher risk of injury to the body from excessive temperatures during exercise in areas of higher humidity. It should also tell you that, while competing in areas of higher humidity, you will need to drink anywhere from two to five times as much water during competition **at the same temperature.**

Then why do people die from dehydration and heat exhaustion faster in a dessert than in an area of higher humidity?

Because the temperatures don't remain the same.

The water molecules in the air also reflect sun light back out into space decreasing the amount of light reaching the Earth and heating it. Therefore, it gets much hotter in desserts and it is the extra heat, which increases the rate of dehydration and the heating of the body.

If it were to get as hot in areas of higher humidity as it does in the desserts (100 to over 125 degrees Fahrenheit), people would die by the tens of thousands.

Training Diet

Here, the myths abound. Contrary to what the marketing people selling vitamins and other nutrients on TV tell you, the average American who eats three square meals per day gets from three to over five times the nutrients they need.

The only people, who eat three square meals per day and don't get enough of any nutrients per day, are the people whose bodies are not functioning properly. It is easy to tell if you are getting enough nutrients by getting a general practitioner or internal medicine specialist (both are medical doctors) to do a blood test and urinalysis to see if there are any deficiencies in your diet.

If they tell you that you need to start taking expensive vitamin pills or other supplements, get a second opinion without telling the second doctor about the first opinion. (Some doctors get a kick back on such pills. I feel that this is a conflict of interest.)

With this in mind, we have known for decades that the increase in use of all nutrients except for carbohydrates, water, and electrolytes only increases by a **MAXIMUM** of 25% for a marathon athlete like a bicycle road racer over the average person.

Common sense should tell you that, without increasing your diet to get the extra carbohydrates required by marathon athletes, and, if you increase your need for these nutrients by only 25%, then you will still be getting at least two to three times those nutrients that your body will need.

If you increase your diet to get the extra-required carbs, then you will also increase the other nutrients and should not need supplements. Taking such supplements will only give you expensive urine.

This should tell you that what you need to focus on getting more of would be carbs and water. Most of the carbs you will need will be complex carbohydrates (see my page on carbohydrate loading.)

The water part is easy; drink lots of liquids.

Where will you get those extra carbs? You will have to get most of them from breads and pasta. If you try to get most of them from fruits and vegetables, you will have to chain your butt to the toilet.

For example, let's say that you just burned 6,000 calories on a 100-mile training ride in the mountains. A 10-inch banana only has 100 calories. You would have to eat 60 of them to get the needed calories. I like bananas but 60 of them in one day?....barf!!! :-)

On the other hand, a two layer chocolate cake with the icing has 4,850 calories. :-) Don't you just love cycling? Just think of all the good stuff you **MUST** eat like spaghetti, breads, and, yes, goodies because you **WILL** burn them up.

Focus on the starchy foods that are either members of the bean, corn, and grain families or things made from these items. This means that it is helpful to understand what compound foods are made of. Read a few recipes for things like breads, pasta, cakes, and cookies and you will be surprised at how wrong general knowledge is about what we should and should not eat.

The goodies are made up mostly of things like wheat, eggs, and milk. Cakes and cookies taste sweet because a little extra sugar is added for flavoring. They really are not unhealthy for you if you are exercising right and eat them in reasonable moderation. Your training and racing will burn them up. Enjoy yourself.

Another myth is this fat free nonsense. The normal healthy diet for a male should be approximately 8% fat. That means that for every ten tablespoons of food that you stuff in your face, one tablespoon should be 80% fat. That should tell you a lot.

Women need an average of about 10% of their diet to be fat. Fat is not our enemy if we exercise properly because it is a fuel. The problem we are having with fat in our society is that we eat more fat than we need **FOR THE AMOUNT OF EXERCISE WE DO.**

So, if you consume about 2,000 calories per day, then 8% of that should be in fat. That is about 160 calories in fat per day. And, if you are consuming an average of 5,000 calories per day (2,000 for life function and 3,000 for training), then 8% should be fat. That is about 400 calories per day in fat. Enjoy your burrito and steak. (The food make-up for a good burrito is beans, wheat, meat, lettuce, cheese, and tomato.) Don't you just love cycling?

This is where it gets good. If you are racing at or above only 50 miles for your aerobic fitness, you will have to eat three square meals per day plus at least one snack to get the carbs you need. A 100-mile racer will have to have at least two to three snacks per day.

Dieting

Most people and doctors are trained to use dieting or starvation for weight loss. It amazes me that our medical field is so primitive and ignorant when it comes to exercise physiology.

First, if you study endocrinology, you learn something very important about why dieting should only be used for extreme cases of weight loss. When the partially digested food (chyme - pronounced 'kime') leaves the stomach and enters the duodenum, the stomach acids in the food stimulate epithelial cells

(cells in the intestinal wall) to excrete certain hormones which stimulate other cells to do certain things.

One of the things some of these other cells do is to excrete chemicals to neutralize the acids in the food so they don't damage the intestinal cells.

Another thing done by some of these hormones is to release the chemicals, which increase the permeability of the cell walls so more sugar can enter the cells, and also stimulate or increase the cells' metabolic rate. This causes the cells to increase their rate of fuel consumption.

It should be common sense that, if you don't get food into the stomach, the proper cells will not release the hormones that increase the permeability of the cell walls and increase the metabolic rate of those cells.

Dieting suppresses the burning of sugar or fuel.

You learn this if you study survival physiology. This is a normal survival function designed into the human body. Our bodies were designed to function in a primitive setting like when our ancestors had to hunt and kill their food. They could go from days to weeks without being able to eat much. Therefore, if they didn't get to eat today, the body suppresses the cell metabolic rate to increase fuel conservation until the next kill was made. Our bodies were not designed to function in a setting of high food availability and low exercise. It is this combination of high food availability and low exercise that is killing us.

The best way to lose weight, based on how the body functions, is to keep eating regularly and exercise. By continuing to eat, you keep your metabolic rate high and burn more calories by increasing your workload.

There are those who say you cannot lose weight just from exercise. Let's analyze this. If you are consuming 2,000 calories per day, and you are

burning 1,500 calories per day, your weight will increase by 500 calories per day (there are 4,000 calories in one pound of fat.)

But, if you increase your food consumption to 3,000 calories per day and increase your caloric consumption to 4,000 calories per day, where are you going to get the extra 1,000 calories per day you are now burning?

There is only one place where you can get them and that is your food stores or fat. It is only common sense that you will lose weight. The better your aerobic and anaerobic fitness levels, the more weight you will be capable of losing because you will burn more fuel per day.

By the way, for health reasons, I absolutely refuse to coach anyone who diets. I have seen too many athletes hurt by doing this. Some have almost died and I won't take part in seriously injuring or killing anyone. I have been trained better than that.



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Part III • Chapter Seventeen

The Effects of Fat

The Effects of Fat

In this chapter, I want to discuss the effects of fat on the athlete.

A number of years ago, a racer I was working with told me that she and her friends considered that every eight pounds of fat you had in your body was like carrying an eight pound bowling ball on your back.

I didn't like this description of the effects of fat on an athlete because it only addresses the dead weight effect of fat on the body and ignores the other effects that fat has on an athlete. I always told my riders that every eight pounds of fat you have is like carrying a kicking, screaming, eight pound baby on your back because the effects of fat have more effect than the dead weight of the fat.

You have to understand that your body stores fat or builds it up in several ways. First, it "marbles" fat into the muscles themselves. This is why a person who is out of shape has no muscle definition. The fat fills in the spaces between the different muscles and the muscle cells.

This marbling of fat into the muscles has a number of effects. First, it interferes with the motion of the muscle cells and muscles. This decreases reactions or reflexes and muscle movement or speed. A person who has considerable fat marbled into the muscles can't have as high of a leg speed as the same person would have without the fat marbled into the muscles.

It should be obvious that having excess fat in your muscles will hinder sprinting ability, climbing ability, and generally efficient racing.

This restriction of movement caused by fat is made worse by the build up of fat in areas, which restrict motion in the limbs. You see this especially well in very obese people who walk funny and have trouble walking.

These restrictions in movement increase the amount of energy required to make the same movements and increase the rate of fatigue for the same exercises for a person with the same general fitness level.

Another effect that fat marbling into the muscles has is that it interferes with the efficient transfer of water and nutrients into the cells and waste out of the cells. This should tell you that it is not possible for a person with considerable fat marbled into the muscle cells to sustain as high of an effort for as long as they would be able to sustain without that excess fat marbled into their muscles.

Add to this that certain fats tend to collect in your arteries blocking and slowing the flow of nutrients to your muscles, which further decreases their intensity and endurance potential. These two properties combined will send you heading out the back door of the pack quickly.

Remember that the heart is also a muscle and subject to the same problems when marbled with excess fat and please note the term "excess".

Now, don't get paranoid and go on some sick diet that will kill you because you have one zillionth of a gram of fat in your body. Your body does need fat for a healthy function. As a matter of fact, the average male needs an average of 8% of his diet to be fat but a marathon athlete needs more because the body prefers to burn fat during those long aerobic workouts.

When you think about it, 8% is quite a bit of fat. It means that for every 10 tablespoons full of food that you ingest, one of them must be 80% fat. The average male bike racer will probably need about 8% to 12% fat depending

on the individual and your metabolism while the average female will need from about 10% to as high as 15% fat.

You will find that the reason why some women who do extensive aerobics suffer extreme reduction in the size of their breasts and buttocks while men and women will lose the "non-digestible" fats from the heels of their hands and soles of their feet is because they are not getting enough fat in their diets in relation to the amount of exercise they are doing. That is why the body turns to burning these harder to burn fats.

My point is that we must be careful not to go from one extreme to another. Keep it common sense and sane.

It is also important to understand that fat is an insulator. It makes it difficult for heat to pass through and out of the body. This is a handicap during races and training on hot days but can be a benefit on really cold training days.

It is also important to know that blockages in the arteries slow the movement of blood, which is a major form of cooling the body. This double strike against overweight people for races on hot days can put them out of action and even cause heat exhaustion very quickly.

Losing Fat The Right Way

Today, most doctors in the US will still tell you that excess weight can't be lost by exercise alone. Exercise physiology has disagreed with this for over 35 years.

I have noticed that the field of medicine is getting closer to learning the truth and beginning to learn that exercise is more important for maintaining health and weight control than they had previously thought. All they need to do is finally pay attention to studies done in exercise physiology from decades ago and they will change their minds.

Doctors, today, are finally learning that dieting is an ineffective way for losing weight. This really blows my mind when one realizes that the proof for this is easily found in endocrinology, which these same doctors and their college professors have studied for decades.

You see, there are certain cells in the duodenum or first part of the small intestine next to the stomach, which detect certain molecules leaving the stomach. These molecules are only present and injected into the duodenum when a person has eaten something and it becomes digested enough to be forced into the duodenum. When the cells in the duodenum detect these molecules, the cells excrete a hormone into the blood, which travels to the pancreas where other cells pick up that hormone and are triggered to excrete adrenaline.

The released adrenaline travels throughout the body triggering body cells to increase their metabolic rates. Without the release of adrenaline, these cells metabolic rates will remain at a "rest" or "depressed" level. This is a survival mechanism built into the human body, which makes it possible for us humans to survive during periods of famine or lack of available food. Without this survival mechanism, we humans would have never made it out of the cave.

It is important to understand that the more cells in the duodenum which are triggered by their activating molecules, the more of that hormone will be released and the more of the cells in the pancreas will be triggered to release adrenaline. This will result in an increase in the release of adrenaline, which will result in an increase in the increased rate of metabolism in an increased number of other body cells. (Sorry, I know I've mentioned this in other chapters but thought it was important enough to repeat.)

Therefore, it should only be common sense that a person who restricts their food intake also restricts their metabolic rate and dieting can't possibly be an effective means of reducing weight loss for prolonged periods of time.

It will also result in permanent damage to the body because, during the period of dieting or starvation, the body isn't getting other nutrients it requires to maintain a healthy body. It is just common sense physiology.

Can Weight Be Lost by Exercise Alone?

To answer this question we must examine the data about exercise and weight loss. First, you have to realize that the doctors' perspective that weight can't be lost by exercise alone is based on incomplete or inaccurate information. If you study bicycle road racing from a physiological perspective, this becomes obvious.

For a long time, doctors made the statement that exercise can't result in the loss of weight without dieting because they believed and quoted that a person could only loose about 300 to 400 calories per workout. This was based on incomplete information.

Recently, the medical world has made a "startling" revelation that exercise can play a better role in losing weight because they have "discovered" that a person can lose as much as 1,000 calories in just one workout. That isn't bad considering that it has taken the field of medicine over 40 years to learn they were wrong about the lower estimates but it is time they were brought into the 21st Century.

We will start with a simple fact we have known about in exercise physiology for over 35 years which is that an average male (5'10") riding at a steady pace of 24 mph (about 38 kph) on flat ground with no wind blowing in a temperature of 75 degrees F (23 degrees C) will burn 1,200 calories per

hour. If you were to maintain that pace for four hours or 92 miles (147 km) under those conditions, you would burn 4,800 calories.

This is very significant when one realizes that there is only 4,000 calories in one pound of fat, that a chocolate layer cake with the icing only has 4,850 calories, and a 10-inch banana only has 100 calories. Plus you have to realize that a larger person, rolling hills, mountains, wind, changing pace, and a temperature variance of at least 10 degrees F will all increase the rate of calorie consumption.

In other words, most of you will burn from a minimum of 5,000 to well over 6,000 calories in your average 100 mile training ride plus the 1,500 to 2,000 calories you burn per day just living. If you are averaging just 300 miles per week, you are probably averaging burning an extra 18,000 to 20,000 calories per week above what is required for daily living.

That is the equivalent of about five pounds of fat per week, which would result in the loss of 50 pounds in about 10 to 15 weeks. But, since you are also eating during this time, it will probably take you about five months or more of long aerobic rides to burn off that much fat.

To ingest that many calories per week, you would have to eat four chocolate layer cakes or 200 bananas (yuk - barf) that week. That is why road racers eat so much pasta and bread. It is impossible to ingest that many calories per week with just fruits and vegetables without chaining your butt to the toilet with massive fiber overload.

This is why the pro road racers who ride 500 to 600 miles per week or, during the Tour de France, ride about 80 to 100 miles per day must eat so much food. I saw one program where a physicist calculated that the average rider in the Tour de France burns the equivalent of 32 jelly filled donuts per day in calories. How many fat people do you think eat 32 jelly filled donuts per day and lose weight?

Therefore, is it possible to lose a lot of weight with just exercise? You bet it is **IF** you do your aerobics with plenty of 100 to 125 mile (160 to 200 km) rides. The pounds will just melt off.

I have done this with riders I have coached in the past. I had a fifteen-year-old male who came to me with a lot of residual "baby" fat. I told him to not diet and his mother confirmed that he in fact didn't diet but still lost all that fat to where he was a very lean and fast racer in just 1.5 years. Actually, his mother informed me that her son had increased his food consumption during this time by two to three times and he still lost the weight. I have seen this happen hundreds of times over the last 35+ years of bike racing.

Now maybe you can understand why I insist that you should not diet while training and just be patient. If you are over weight, just keep doing those long aerobic rides and, even as just a recreational cyclist, the pounds will slowly disappear.

It should only be common sense that if you are ingesting 4,000 calories per day and burning 6,000 calories per day, you will lose weight. Actually, if your difference in consumption and burn is that high you will suffer damage to your body and end up in a hospital very quickly, in about a year or less.

By this time, it should be common sense that the most important thing for weight control is a good exercise program with a lot of aerobics.

But it is also important to understand that anaerobics will also increase your caloric consumption. This is because you have to change pace, overcome more wind resistance, and build more muscle mass which requires carrying more weight which, in turn, requires a great caloric consumption to move the additional mass.

Therefore, a really good program will be a balance between aerobic and anaerobic exercise.

Need to lose weight? Just keep stomping those pedals.

By the way, I call my bike my trusty lard burner.:-) Pass the chocolate cake, please.



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Part III • Chapter Eighteen

Basic Weight Program

Basic Weight Program

I decided to include the following basic weight program as an example after seeing a few efforts from others at putting one together.

This is a good program around which any good weight program can be built. This program is designed more for road racing. To modify it for track, swap the second and third sets around so that your second strength set is the second set and the endurance set is the third set. Then change the number of repetitions in the second set for my strength set by decreasing the number of repetitions. A Criterium specialist would use the same set sequence as the track racer with the ten repetitions for the second set.

Upper Body

Bench Press

Lying flat on a bench and pushing a weight up towards the ceiling with both arms (works chest muscles.)

Lat Pull Downs

Using a machine with a cable where you can pull down towards the floor against the weight. Get on your knees and pull the bar down in front of your neck to work you latisimus dorsi (upper back muscles at about the shoulder blades.)

Up Right Rowing

Standing upright with a bar bell in both hands and your hands together at the middle of the bar. Lift the bar straight up to your chin without bending over (works deltoids.)

Arm Curls

Sit or stand with a bar bell in both hands and your palms facing up at shoulders width. Raise hands up toward your shoulders without moving your body (works biceps.)

Arm Extensions

Lying flat on your back with your head at the top of the bench. Hold a bar bell in both hands over the top of your head and beneath the end of the bench with your hands at the center of the bar bell and facing the ceiling. Your upper arms should be pointed at the ceiling. Extend your forearms until they are fully extended towards the ceiling without moving the rest of your body (works your triceps.)

Setups or Crunches

Lying on back with knees bent and feet near your buttocks while flat on the floor. Place your hands behind your head and raise up towards your knees. You can do this with or without weights.

Legs

Leg Press or Squats

Leg press uses a machine where you sit down and press the weight out in front of you with your legs. Squats use a bar bell on your shoulders where you squat down until your thighs are horizontal with the floor and stand back up.

Leg Extensions

Sitting on a machine with the padded part you push against in front of your ankles. Extend your legs out in front of you (works quadriceps or front of thighs.)

Leg Curls

Lying on same machine as leg extensions with the padded push part of the machine behind the ankles and your knees at the end of the bench. Curl the legs up towards your buttocks.

Toe Raises

Standing with weights on shoulder with toes on a small board like a 2x4 and heels on floor. Raise up on toes.

For each workout secession, do three sets of each exercise with 10 reps for the first set, 20 reps for the second set, and 10 reps for the third set.

This workout should take about an hour to an hour and a half. Remember to do some stretching before the workout.



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Part III • Chapter Nineteen

Finding a Cycling Club

Finding a Cycling Club

Over the years, a number of people have asked me about finding a good cycling club. This chapter is devoted to that subject.

Over the last 35 years of being in and around bicycle racing, I have traveled across the nation and moved a number of times. I have had to get in touch with local bicycle racing and racing clubs. I have found that the first place to check about getting in touch with bicycle racing and racing clubs is to find a bicycle shop which sells professional racing bicycles. They are the people who will sell most people their racing bikes, wheels, tires, and other equipment. Therefore, they are the easiest way to find the local clubs. You will find that the local yellow pages are your best resource to obtain this information.

You must realize that each bicycle shop will usually be associated with **ONE** cycling club and will have a tendency to be biased towards that club. Some times the club will be racing only or recreational only but often the club has members involved in both aspects of the sport. Over the last 20 years, some clubs have specialized even more by focusing on mountain biking, road cycling, track racing, or even cyclocross.

Plus you have to understand that every club has its unique personality.

Some clubs will be very well structured offering training and coaching for every one from beginners to professionals. Other clubs will just be a group of people who approach the sport from a much more "just for fun" attitude where what you have already learned before joining the club or what you

learn from your own mistakes will be all the training you will get. Then you have everything in between.

For example, some structured clubs have been set up to provide coaching and support for only upper level racers while other clubs may specialize in providing training for beginners.

Therefore, you need to be selective in choosing the club. Understand that most bike racers who stick with the sport for more than just a few years will belong to at least several different clubs and many will belong to two or more clubs at the same time. Regardless of what you may have heard, changing clubs is not taboo.

Be sure to attend meetings and club rides for at least several different clubs to make sure you get a better feeling for the club before you join it. You don't want to pay your membership, buy jerseys, and get a club name on your racing license then find out that the club you would prefer to ride with or for is just down the street. Don't let people pressure you into joining the first time you attend a meeting unless you came to that specific club for what it offers you.

The first thing you have to do before you even pick up a phone book and begin calling bike shops is to decide what you want out of the sport and a club.

Set your goals and priorities such as you want to learn to race and train right, you want to belong to a team, you want a structured program, you may only want fitness development, or you may just want to ride with fun people to make your cycling more enjoyable.

The latter is why I went looking for a cycling club and got involved in racing. After you have set your priorities and goals, go shopping for a club with the

understanding that you will not find a perfect club. You will need to find the club which best fits your priorities and goals.

I strongly recommend that anyone new to the sport or in search of coaching start with a well-structured program, which provides some form of coaching or structured instruction. This will do more to help keep you from being injured and help you get a good start in the sport.

Even if you are not intending to go pro, it is a good idea to learn how to ride and race right as soon as possible. Less than 1% of the riders who start racing will ever turn professional.

Hopefully, some day, we will learn to improve the sport and keep riders in the sport longer by developing minor league pro racing as baseball, basketball, golf, tennis, and all motor sports have by promoting local cat 3 and 4 pro racing the way they do in Europe. In some countries, they have professional racing all the way down to category 5 to keep riders in the sport by helping provide better financial assistance to the riders. (In professional racing cat 1 is our NFL, cat 2 pro is amateur cat 1, cat 3 pro is amateur cat 2, cat 4 pro is amateur cat 3, and cat 5 pro is amateur cat 4.)

But at this time, we are lagging well behind most of the top sports in this country and bicycling in Europe in that we are resisting the development of local to regional or minor league professional bicycle racing.

Therefore, know that the vast majority of racers will remain amateur for the rest of their lives but will want to be able to do well in races. After all, it is more fun to at least be competitive so you can enjoy being part of the battle. There is nothing wrong with wanting to be a very good cat 2 or 3 weekend warrior. As a matter of fact, these people are the grass roots mainstay of our sport and have been largely responsible for keeping it alive.

You will find that your attitude about bicycle racing will change as you mature in the sport. You may outgrow a program or develop different priorities than the people running the club.

You may just reach a point to where you just want to train and race or even just ride training races for fun. You and a few teammates may want to start your own club to have your own little cat 3 racing team made up of close friends where you can develop and use European team tactics just for fun and achievement.

These are your choices and there is nothing wrong with them. Do not attempt to force these changes on other people because they have a right to their own choices. This is a very common mistake made in cycling clubs.

A club will be doing fine going in one direction and one or more persons will decide they know what is best for that club and its members. They will then try to convince the other members to change directions with themselves. If the club members readily decide to make that change fine, but if there is resistance in the club, remember that others have chosen that club because it had the personality they wanted in a club.

You changing that personality will drive them away or turn them against you. It isn't worth the fight and the resultant hard feelings.

If the other members want to keep the club as is, don't destroy the club fighting over who owns the club or which direction it should go. Just start a new club and build it to fit your desired personality or find another club, which does fit your personality.

Therefore, it is a good idea to keep an eye open for a particular group of people who enjoy the same rewards from cycling that you enjoy. You may find a group who wants to promote women's racing or Junior racing and you want to be part of it. Fine, do it.

You may just want to belong to a group of crazy guys who like hanging at the back of the peleton telling bad jokes. Been there, done that. I have also set on the front of the pack in long training rides telling bad jokes. I insist on enjoying my bike racing.

As a matter of fact, forming new and diverse clubs is healthy for the sport because it offers more people choices, which will entice them to belong to or remain in the sport.

Some people coming into the sport don't care about structured racing and just want to be with a group of people who enjoy jamming with friends on their bikes on country roads. Also, creating new clubs creates local competition, which helps aspiring racers to develop, and makes racing more fun.

Having the only club in town is not as healthy for the sport or as much fun as having two or more diverse clubs in town for people to choose from.



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Part IV • Chapter One

Riding Discipline

Riding Discipline

The chapters in this section are going to deal with the technical aspects of bicycling and pertain to all cyclists. It is amazing that most of this material contained in the following chapters is so completely neglected.

By using the material from these chapters to develop better and more efficient riding habits, I could easily improve your riding efficiency, results, and enjoyment by anywhere from 5% to as high as 20% for most cyclists without changing your training, tactics, or psychology.

Learning what I will teach you in the following chapters will make it possible for the average recreational cyclist to ride a 100-mile ride using 10% to 20% less energy. The average pro can improve his performance by at least 1% to 3%, which is HUGE!

By neglecting the **fine points** of this material, you are denying yourself a higher quality and enjoyment of cycling. It is crucial that you pay attention to the finest details to obtain maximum improvement. The little things add up and often count the most.



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Part IV • Chapter Two

Spinning

Spinning

This chapter is coming to you by popular demand. I have had a number of requests to explain what we call spinning. I will explain it from the perspective of what is meant by spinning and from a scientific perspective as to why and what it does.

What Is Spinning?

Basically, spinning is maintaining a cadence of at least 70 revolutions per minute. By this, we mean the revolution of one crank arm or leg. If you drop below 70 rpms, you are "pushing" or "big gear mashing."

The reason most people prefer to spin is because it provides a more fluid pedal stroke, which saves energy, maintains a more even and regular pace, and increases riding endurance. Most people don't realize that it also improves bike handling, especially under emergency circumstances.

To understand why and how spinning does these things, we turn to science.

The Science of Spinning

One of the things you learn when studying kinesiology (biomechanics) is that the muscle cells in a muscle do not all contract or "fire" at the same time. If they did, we would have full contraction of every muscle every time we tried to use it.

Every muscle contraction would be so intense and violent that we would beat ourselves to death every time we tried to move any part of our bodies. We

would tear muscles, tear tendons away from the bones, and even crush bones with every attempt to move.

To prevent all of these not-so-good things from happening, the nervous system only stimulates certain cells at a given point in the range of movement for that muscle. In other words, when you start to contract the biceps brachii (the large muscle of the upper arm which moves the lower arm towards the shoulder commonly referred to as the biceps) of the arm, only a small percentage of the cells begin to contract in a controlled manner, as the forearm starts moving towards the shoulder.

As the forearm continues moving towards the shoulder, the nervous system continues to stimulate more cells causing the arm to continue moving. This movement will continue until either the nervous system quits stimulating more cells or the biceps muscle becomes fully contracted.

It is very important to understand that, if the wrong cells are stimulated at the wrong time during the movement, we get a very jerky and uncoordinated movement.

This type of movement wastes energy and fatigues the muscles quickly. Two excellent examples of this type of movement are when babies and toddlers are just learning a movement such as walking or running, or you attempt to learn a new movement such as in playing tennis or dribbling a basketball for the first time. This is why you begin bouncing on the saddle when you try to spin faster than you have trained your legs to spin.

This is a very important principle to understand for two reasons. First, to maximize speed, strength, energy use, coordination, and endurance, we must train our body to stimulate the right cells at the right time during the movement. The more precisely we fine tune these cell stimulations, the more we improve our speed, strength, energy use, coordination, and endurance. We also decrease the potential for injury such as strains and pulls of the muscle.

Think of it as being like fine tuning a high performance machine or racing engine. The better tuned it is, the better the engine runs. If the engine is not tuned right, it runs in a jerky manner which decreases speed, increases energy consumption, and increases the potential for damage to the engine.

Another reason for spinning has to do with cell function in relation to amount of workload. If you have lifted weights, you know that lifting a heavy load fatigues your muscles faster than lifting a light load. This is because the increased load does more molecular damage.

The same thing applies to riding a bicycle. Remember that I told you that your cells don't know whether you are riding a bicycle or lifting weights. All they know is resistance, rate of contraction, duration of contraction, duration of exercise, and number of repetitions.

If you apply the same workload to a cell riding a bicycle as you do lifting weights, the cell functions in the same manner. Therefore, pushing the big gear will fatigue a muscle faster than spinning a little gear because it will do more molecular damage per effort.

This is another reason why professional road racers spin for most of those long road races and stages. Spinning increases your endurance. The trick is to gradually develop the strength to spin bigger gears so that you go faster with the same cadence, effort, and molecular damage. See my chapter on weekly training.

In coaching, we have a discipline called Motorskills Development. It is the science of developing muscle movement coordination. Basically, we are fine-tuning your biological engine to increase your speed, coordination, strength, endurance, and energy use and to decrease the potential of injury. In motorskills development, we are trying to get the cells to fire as close as possible to the most efficient point during the desired movement.

The closer we can get the cells to fire at precisely the right instant, the more efficient the movement, the better it feels to you, and the more you enjoy doing that movement which also increases your self confidence in performing the desired task.

We use a number of techniques to increase your motorskill development. The most common of these is movement repetition with coaching to make sure that you are training your nervous system to perform the movement properly and most efficiently. Oops, another reason for a professionally trained coach. :-)

In cycling, there are two training methods that are good for motorskills development. The first technique is to move very slowly (almost at a stand still) in a big gear while moving very slowly through the range of motion to make sure you are performing the movement correctly while training the nervous system to stimulate the right cells at the right time. The second technique is spinning.

The problem with the first technique is that you have to either be or have present a kinesiologist (like me) to tell whether you are performing the movements correctly. If you don't, you can easily train the nervous system to stimulate the cells improperly. By the way, this is the same technique used in Ti Chi.

Spinning does the same thing as a kinesiologist in a crude and more natural manner. First, it is based on repetition by using repeated movement to train the nervous system to stimulate the cells more precisely. Second, if you exceed the training of the nervous system, the muscles jerk, you bounce, and you know how well developed your motorskill movement is which we call feedback. It should be common sense that, up to a point, the more often you cause your muscles to contract, the more developed your nervous stimulation will become.

The way the process should be done is to start out riding at a cadence of at least 70 rpms (even if it feels slightly uncomfortable) and, over a period of thousands of miles, your muscle coordination will increase and your comfortable cadence will also increase. This is why bicycle racers spin so much, especially during the off-season.

It is important to understand that you will also improve your use of big gears by fine-tuning your cell stimulation with spinning. Even the big gear mashers should spin most of the time. People who have never learned to spin have no idea of how much energy they waste, how much sooner they fatigue, and how much stronger they would be if they just spun on a regular basis.

The second reason for spinning has to do with what we call the "muscle pump" syndrome.

When muscle cells contract, they get shorter and fatter which is why our muscles "bulge" when we "make a muscle." When these cells bulge, they put pressure on the cells and blood vessels around them.

This increased pressure squeezes the blood out of the vessels and valves in our vessels prevent the blood from moving backwards toward the heart. Therefore, the muscle contractions force the blood to move forward towards the heart and help the heart move blood through the body. This is why we call it a muscle pump. If the muscle contractions are short enough, they increase the amount of blood being moved through the muscles and increase your performance.

If the muscle cell contraction is hard enough and long enough, it causes a resistance to blood being pushed into the muscles from the heart. This decreases the amount of blood flowing through the muscles and increases the workload on the heart. This occurs with such activities as doing strength work in weight lifting and pushing a big gear on a bicycle. Oops. This is one of several reasons why the pros have learned to only use a big gear for relatively short distances.

How fast should you spin?

For the average recreational cyclist, having a sustained comfortable spinning of about 80 to 100 rpms should be adequate. Racers need to achieve several goals. The first is to have a sustained comfortable spin of between 80 and 120 rpms. The second is to be able to have a maximum spin of at least 160 rpms for sprinting. Ooo, hope you just realized another reason why spinning improves your sprint. Leg speed, leg speed, leg speed. :-)

There are two types of spinning. First is the easy spin used by racers on easy or off days to help the muscles recover from intense workouts. The muscle pump action of light spinning helps move more blood through the muscles without doing much damage and increases the rate of recovery for the muscle.

The other type of spinning is to push moderately or hard against the pedals and is often confused by racers as being easy spinning. This type of spinning is done during your aerobic and anaerobic workouts. A lot of racers think that because they are spinning at all that they are resting which causes many of them to go into overtraining.

If you are pushing hard against the pedals, you are not doing easy spinning.

Myth Buster

A lot of people think that Eddy Merckx was such a great racer because he pushed big gears. This is wrong. The proof for this is in how Eddy did his hour ride.

Eddy used a 52 x 14 gear for his ride. This is a 100-inch gear which people consider a big gear. Now, set down and calculate his cadence for his hour record and it comes out to **120 rpms**. That, my friend, is spinning.

You see the real secret to Eddy being Eddy is that he was strong enough to spin gears that the rest of us could only push. When Eddy was hammering everyone in his "big gears," he was spinning and everyone else was pushing a bigger gear trying to stay with him.

That is one of the big secrets to being the best racer. Get to where you can spin a bigger gear than everyone else can push. It works, ask Eddy. Eddy was a spinner, just a big gear spinner.

Makes you respect Eddy even more doesn't it?

For Fun

If you think you're fast or would just like a taste of how fast Eddy was, find a nice, long, flat stretch of road or Velodrome, put your gears in a 52 x 14 gear, **TRY** to run it up to 120 rpms, and, **IF YOU CAN GET IT TO 120 rpms**, hold it there for an hour.

About the time your kneecaps explode off the front of your legs and set off a police radar unit five miles up the road, you will learn a new respect for the Great Eddy Merckx.

Now, go for a nice spin.



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Part IV • Chapter Three

Ankling

Ankling

I recently received an email from a woman who thanked me for the training information I was providing and made a comment about all her coach had spent the winter teaching her was "pretty pedaling."

She was obviously speaking about riding technique and probably about what we call ankling. I do hope that this was not all her coach taught during the off-season but it is not insignificant.

Most people think of ankling as a pedaling technique used to keep the bicycle from slowing while the crank arms are passing through the "dead spaces" at the tops and bottoms of the arch through which the pedals move and neither foot can push down on the pedals. This is important because acceleration requires more energy than maintaining momentum.

Therefore, you want the pedal stroke to apply force to the rear wheel for the entire 360 degrees rotation for the pedals. Ankling does solve this problem but so does spinning. Obviously, the two combined will mean a smoother and more efficient pedal action.

But Kinesiology tells us that ankling means much more than applying force to the rear wheel through the dead spaces. There is a simple little rule we use in kinesiology when studying applied forces. It simply states that the total force exerted between two points is the sum of all the lesser forces being exerted between those two points.

The two points we want to consider here for cycling are the pedal and the head of the femur (hip joint for the leg.) The muscle groups we will be

discussing are the glutes (butt muscles), hamstrings (back upper leg muscles), quadriceps (front upper leg muscles), and calf muscles (lower leg muscles.) Two exercises we will use as examples for this essay will be the squat (for upper leg strength) and calf raises (for lower leg strength) for weight lifting.

For simplicity's sake and to make an example, let's say our cyclist (Bob) is capable of doing a 600 pound squat and a 200 pound calf raise. That tells us that each upper leg is individually capable of 300 pounds thrust and each lower leg is individually capable of 100 pounds thrust. This means that each leg is capable of generating 400 pounds thrust between the hip and pedal.

After I originally wrote this article, some one emailed me that this analysis was flawed and that the total thrust would be equal to the weaker of the two contracting muscle groups. If his statement were true, the most thrust you could generate would be the thrust from your calf muscles which would only be about 100 to 150 per leg, which would not account for the work being done by professional bike racers or weight lifters.

You see, he was assuming that the insertion points for the upper muscle groups were in the pelvis and femur or upper leg and the insertion points for the calf muscles were the foot and tibia or lower leg so that these muscle groups did not share a joint crossing.

If this were true, his statement would be true because the contraction across a joint, which was the weakest, would be the muscles, which would give out if the other muscle groups were to fully contract. In other words, if the calf muscles could only hold 100 pounds and the upper leg muscles contracted at 101 pounds, the calf muscles would have to release or be damaged.

But, if this person would study their anatomy and kinesiology, they would find that the upper and lower leg muscles are what we call two joint muscles. The upper leg muscles cross both the hip and knee joint and the

calf muscles cross both the ankle and knee joint. Since they both share a joint crossing, their applied force is cumulative.

Most cyclists pedal in a flat-footed technique where the foot remains in a fixed position. This means they are using their calf muscles strictly in an isometric exercise to hold the foot braced in a fixed position. They are not using the calf muscles to generate an applied force.

If our cyclist, Bob, is using a flat-footed pedaling action, then the maximum force he can generate between the pedal and hip is 300 pounds of thrust. By simply moving his foot (ankling) to cause the calf muscles to generate additional force during the pedal action, Bob can increase the amount of thrust to the pedal by 100 pounds or **33%**.

By not ankling, Bob is decreasing his maximum potential power output by at least 20% to 25%. That is a huge handicap and I will gladly permit my competition to willfully have such a handicap. Thank you.

And it gets better. You see, when a person uses a flat pedaling style, they have a normal tendency to let the leg get lazy on the up stroke. When they do this, they permit the upward moving leg to rest on the pedal which forces the down ward pushing leg to lift the weight of the up ward moving leg.

Let's say each of Bob's legs weight 30 pounds. Then we subtract the 30 pounds from the 300 pounds thrust to get only 270 pounds thrust going towards driving the rear wheel (for simplicity's sake we will ignore other energy losses from directional changes and friction.)

So, we have decreased Bob's maximum thrust towards the rear wheel from 400 pounds to 270 pounds, which is a 32.5% reduction in maximum potential thrust.

But it gets better. Let's say that Bob does develop a proper ankling technique. He would also train and condition his legs to pull up on the back

upward stroke. This will cause Bob to add to his maximum potential thrust because his "opposing" muscles are also helping drive the pedals forward while lifting the weight of his upward moving leg. Let's say that the net increase in thrust generated by the upward moving leg lifting against the pedals is 50 pounds thrust.

Bob now has a maximum potential thrust of 450 pounds, which is an increase over the 400 pounds of 12.5% and an increase over the 270 pounds of 66.7%. This is incredibly huge. Imagine increasing the amount of potential thrust to the rear wheel by two thirds simply by changing your pedal action. It works.

Now, maybe you can understand why that pretty pedaling can be pretty important. Suddenly, you can easily race at the next higher category by changing nothing but a simple pedal style.

A great example of this was a very good racer from the 1970's named Lenard Harvey Nitz. He was an incredible racer. He was the strongest and fastest bicycle racer in the US. Well, until they tested him and the other top 30 racers in the US. They were amazed to find that Nitz, in strength tests, was the weakest of the top 30 racers in the nation.

He was so much weaker than the other top 30 racers, that the exercise physiologists who tested him stated that, if he had come to them before he started racing, they would have told him to not race bicycles (so much for the fabled genetic potential. :-)

Then why was Lenard the fastest racer in the US?

Simple, his pedal action was so much more efficient than anyone else's that he delivered so much more of his maximum potential energy to the rear wheel than his competitors that he was delivering more NET thrust to his rear wheel. Therefore, he was faster.

Let's say another rider, Fred, can only squat 500 pounds, can only do 150 pound calf raises, and he can only deliver 30 pounds on the up stroke. Fred's maximum potential thrust between the pedals and his hips is 340 pounds as compared to Bob's 450 pounds. If Bob pedals flat footed he only has a **NET** of 270 pounds thrust as compared to Fred's 340 pounds if Fred ankles.

Who is most likely to win the race? It depends on their pedal action. One more reason why the strongest rider does not always win. The best rider wins. Think about it. It works.

Imagine improving your climbing, sprinting, or attacking speed by 66.7%.

Proper Pedal Action

What is a proper pedal action? The most important part of it is to make sure you are doing a downward thrust with the toes or foot on the down stroke of the pedal. This means that you have to lift your foot on the back up stroke so you can push down on the down stroke again.

If you are lifting your foot away from the pedal on the up stroke, it is not possible for you to rest your leg on the pedal. That automatically solves the lazy leg problem. You have killed two birds with one stone.

To get your legs to actually pull up on the backstroke takes a concerted effort and practice. These movements are important to have as a habit for your normal riding but are even more important for climbing, sprinting, and attacking. This is as important for recreational cyclists as racers.

If you are not ankling and want to start, you must be careful to make the change gradually. Your calf muscles will not be as well developed as the rest of your leg muscles. To force them to suddenly do much more work than they are used to will quickly fatigue them and worse. You could strain, pull, or tear them.

The best way to start is to occasionally push down for one or two strokes with each foot or pull up with each foot. You might only do this a few times each ride.

As these muscles gradually condition, you can do the exercise more frequently and for more strokes. It should take a cyclist months to bring their calf muscles up to the same conditioning of their other leg muscles.

You do want to be careful to not fatigue unconditioned muscles during your ride or you will find yourself struggling home with very painful calves. No fun.

This has to be a gradual process and is best done during the off-season. It can be done during the on season if you use due caution. The regular practice over a period of months will cause the action to become automatic.

I started doing it over 30 years ago and over 12 years ago I tried to do a demonstration on flat pedaling and couldn't because it was so automatic to ankle.



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Part IV • Chapter Four

Two Words

Two Words

The two most important words in cycling are relax and smooth. Throughout my chapters on the technical aspects of cycling, you will see me use these words. They are crucial to improving your performance and are much of the difference between a pro and a rookie.

Relax

It is very important that you be as relaxed as possible while riding or racing. Tensing up your muscles during a race greatly increases your caloric consumption and rate of fatigue. It also increases the time required for reaction and decreases your motorskill efficiency.

If you are not used to something, it is normal for you to tense up. This is a normal subconscious response to an unfamiliar situation and it is telling you that your subconscious mind does not feel confident with your ability to handle a circumstance. It is very important for you to at least recognize and listen to this warning. Your mind is telling you that it has not had the experience or practice at performing a particular skill or activity and is, therefore, apprehensive.

An example of this has to do with a rookie riding paceline. It is common practice for more experienced riders to not understand the significance of this when a beginning cyclist sits further behind another cyclist than he should or tenses up if he rides closer.

They normally pressure and encourage the rider to ride closer to the wheel in front of him. Actually, this is the wrong thing to do.

The fear and apprehension of the rookie is telling that rookie that he needs more practice and experience at following a wheel before he should ride that close. Causing a rookie to ride closer than he feels comfortable often causes crashes because he has not learned enough and developed the appropriate reflexes to safely ride closer. Therefore, he should not sit closer than he feels comfortable or can relax.

As he gains more experience, he will move closer and closer to the wheel in front of him. This is telling you that he is gaining the experience and developing the reflexes to comfortably ride that close. This is a natural physical learning and developmental process.

I have learned that the proper technique in teaching a beginner how to ride paceline is to first explain the technique and why it is done that way. Next, explain that the rider should ride as close as they feel comfortable and that, with time, they will gradually move closer to the rider in front of them. This will permit the rider time to develop the experience and motorskills necessary to ride close safely.

You can have the same problem in any situation for which you are not comfortable such as cornering or riding in a fast moving pack. Even a pro will have an off day and find himself tensing up for a situation he has faced many times before.

The tendency when one feels uncomfortable in a situation is to tense up the muscles. That is actually the worst thing you can do because tensing up the muscles increases the time it takes for you to react to a situation and decreases the mobility of your limbs. Both of these decrease your ability to make the moves necessary to avoid a hazard such as missing a wheel or crash.

When feeling that you are tensing up, there are two good responses, which can help you survive the situation. The first is to back off until you feel comfortable. The other is to perform a relaxation technique.

The relaxation technique is very simple and is based on the kinesiology of tensing up in the first place. When you tense up, you grab your handlebars harder than normal to obtain better control. The increased gripping of the handlebars requires that you tense up your forearm muscles to leverage against your body. The tensing of the forearm muscles requires that you tense up the upper arm and shoulder muscles for leverage purposes. All of this stiffens your arms and shoulders decreasing your steering mobility and increases potential injury.

Let's say you are a pro approaching a corner and, for some unknown reason, you tense up, knowing it will decrease your cornering ability. You know that tensing up in a corner will cause you to pull hard to the outside of the corner. You can stop the problem before you commit to the corner.

What you do is completely relax your fingers from around the bars while keeping the bars in the palms of your hands. This causes the forearm muscles to relax which, in turn, causes the upper arm and shoulder muscles to relax. Then gently and firmly wrap your fingers around your handlebars without tensing your forearm muscles. This will give you a firm grip on your bars with the relaxed muscles required for proper control.

The best thing is prevention and the best prevention is structured practice and understanding of technique. Most of the chapters in the Riding Discipline section will (1) teach you how to do the task, (2) why to do it that way, and (3) structured drills to improve your motorskills for that task.

This is the single most neglected part of training and coaching in bicycle racing and, yet, it can provide you with considerable benefits in energy conservation and performance improvement.

It is only common sense coaching, that the more recent experience you have in performing a particular skill, the less likely you are to inadvertently tense up. It also helps improve your overall self-confidence.

Smooth

If you have ever ridden behind a rookie or recreational cyclist and then behind a pro racer, you have noticed that it is much easier, safer, and more enjoyable to ride behind the pro. This is largely because he is much smoother in his riding discipline. He had to be to survive long enough to become a pro.

Riding in a recreational pack is much less critical because they tend to ride much further apart. Therefore, there is much more room for error before causing a crash. In a Men's pro pack, the riders ride so close together that they will regularly be on the verge of making contact and often do without crashing. They maintain this closeness while cornering at speeds of 25 to 35 miles per hour.

If you sit in a corner and watch the distance between the front and back wheels of pros, they regularly ride only a few inches apart through the entire corner without the distance between their wheels varying by more than one inch.

This kind of close racing requires very smooth riding just to survive. Erratic riding causes crashes in such tight quarters. To be safe in such tight quarters, riders must be predictable and being predictable requires being smooth.

Most pros will tell you that one of the most important skills to learn is to be able to ride a straight line for long distances. This is very important when in tight quarters because you have to keep a relatively straight and smooth line. A wobble of just six inches can put you and others down in an instant.

You can practice by trying to ride on the lines on the shoulder of the road or in parking lots without coming off the line for as long as possible. The proper technique is to look as far up the road as possible while using your lower peripheral vision to check the position of your front wheel on the line. You will find that to do this, you must relax. Tensing up will cause you to wobble.

You will also find that you will ride much smoother if you learn to spin than if you push a bigger gear. Pushing the bigger gear does two things to your body movement, which will make you erratic, and you probably won't notice it.

First, you tend to move your center of gravity just enough from one side to another so that you will cause your bike to wobble as much as six to 10 inches both sides of your main line.

Second, pushing a big gear makes it impossible to maintain a constant push on the pedals. This will cause just enough pace variance that it becomes impossible to ride behind a big gear pusher without braking, jumping, braking, and etc. I hate riding in a paceline behind a big gear pusher because everyone behind him is constantly changing pace. You get a terrible accordion effect, which prematurely fatigues everyone in the paceline.

If a pro gets on break with a rider who is erratic, he will refuse to work with him. If it is early enough in the race, the pro will drop back to the peloton. If it is late enough in the race that a break will almost certainly stay, the pro will grab the rider causing the accordion effect by the jersey, say, "You're out of here", and sling him backwards out of the break.

Why would a pro do this? Because he knows that acceleration consumes more energy than a steady pace and constantly accelerating and braking will prematurely fatigue everyone in the paceline almost certainly causing them to be caught and dropped by the pack. It is suicide to stay with an erratic rider.

Under the chapter Paceline, I will teach you the proper technique for the fastest and most efficient paceline possible and then how to destroy a paceline as a team tactic.

How do you develop this kind of smoothness? I teach a riding technique which will quickly improve your riding. It was designed based on track racing. The smoothest paceline riders are track racers. The biggest mistake that roadies make is to learn to control their speed with braking instead of through their pedaling. You need to learn how to control your speed through your pedaling because it is more effective and accurate. This will also make you much better at blocking.

When you are out on training rides, you try to control your speed by the amount of pressure you put on your pedals. If you find yourself closing on the wheel in front of you, decrease the amount of pressure you are placing on the pedals (we call this soft pedaling) instead of just grabbing your brakes.

Your brakes should be used only in an emergency when leg control is not adequate or on down hills. (I will cover professional braking in another chapter.) As you decrease the amount of pressure, the bike will slow until you are traveling at the speed of the bike in front of you. You must learn to become as in touch with controlling the speed of your bike through your legs, as you are when you are walking. You have to practice this until the bike becomes an extension of your body the same way your shoes do when you walk.

Riding a bicycle should be as smooth as dancing a ballet or waltz. It should be fluid and have a beautiful rhythm. By using the training systems that I will teach you, I developed a reputation for being a very smooth rider even years after I quit serious racing and became a weekend warrior.

I was setting on the curb watching a race at San Louis Obispo, CA and was talking to a young lady sitting a little ways from me. She asked me my name and when I answered, she said, "I know you. My boy friend told me about you. He said that you are the smoothest rider in the pack and everyone wants to ride on your wheel."

Sometimes you get your best and most meaningful compliments from your competition.



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Part IV • Chapter Five

Paceline

Paceline

The Proper Technique

The paceline is the most fundamental tool of a road racer. I have won races with a solo by depending on the mistakes that most riders make in riding paceline to give me extra time.

I knew when and where they make their mistakes and what it costs them. An example of this is on transitions such as a 180-degree turn. I know that since most riders don't know the fundamentals to proper paceline transitions they will lose 20 to 40 seconds on a solo rider on a 180 degree turn, I can gain 20 to 40 seconds on a chase group at a 180 degree turn. A properly done transition should not cause a paceline to lose any time on a solo rider.

The first and most crucial aspect of a properly done paceline is to keep it smooth. It requires more energy to accelerate than to maintain a steady pace. Therefore, the best and most efficient paceline will be at a smooth, steady pace to maximize the efficient use of the energy reserves of all of the riders in the paceline.

I call the maintaining of the smoothness and efficiency of a paceline, maintaining the integrity of the paceline. Maintaining the integrity of a paceline becomes very important when you realize that team time trials and team pursuits are often won by one hundredth of one second and that it only takes an inch to win a road race.

The function of the paceline is that one rider will do most of the work while the other riders are resting as much as possible so they can do as much work as possible when they are at the front. The more work riders have to do when they should be resting, the less work they will be able to do when at the front of the paceline. The more work the riders can do while at the front, the faster the paceline will travel with the same riders. Remember this principle because all paceline function is designed around it.

In order to maximize the smoothness and efficiency of the paceline, it is crucial to keep the pace as smooth and steady as possible. Any time that a rider at the front or within the paceline makes a sudden change in pace; it will cause the distance between the riders to suddenly change.

If the distance in front of a rider suddenly increases, that rider must close the distance in front of him.

Any time a rider has to catch another rider, he must travel faster than that rider. Traveling faster than another rider means that he is doing more work than that rider.

This plus the acceleration to the higher speed increases the workload of the rider. All of this takes away from the energy reserves of the rider and decreases the total work he will be able to contribute to the paceline.

Therefore, if the lead rider in a paceline jumps or suddenly accelerates, the riders behind him who should be resting to do more work at the front will be forced to work harder than they should. This not only takes away from the potential speed of the paceline but also prematurely fatigues everyone in the paceline causing it to break up and be caught much sooner.

If a rider grabs his brakes and suddenly slows, he forces the riders behind him to also grab their brakes and slow. It is normal when braking suddenly to lose more speed than the riders in front of you so that you are now forced

to chase. You can see how over braking can affect the potential success of a paceline. (See my chapter on Braking.)

Accordion effect is when one or more riders in a paceline slow, speed up, slow, speed up, and etc. constantly. This forces the riders behind them to brake hard, jump, brake hard, jump, and etc. Such a paceline is doomed from the start to failure. This is the worst possible condition for a paceline.

We are going to analyze paceline technique with two assumptions. First, everyone in the paceline wants it to succeed and, second, the topography is flat. Remember that a break away is a paceline race between the break and peleton. The smoothest paceline will win.

To have the smoothest paceline, it is important to learn to control your speed with your legs and feet and not by braking. In a properly run paceline on flat ground, the only time you should touch your brakes is in an emergency. The smoothest paceline riders are experienced track racers because they don't have brakes and **MUST** depend completely on their legs to control their speed. This forces them to learn to be smooth. Therefore, it is best if you learn to control your speed by controlling the amount of pressure you apply to your pedals.

With practice, you will find that you can much, much, much more accurately control your speed by controlling pedal pressure. You need to practice this technique until you learn to feel your speed through your legs. This permits you to much more effectively and finely control you speed. Your bike must become an extension of your body just like your shoes are when you walk. You think and it responds.

The technique is simple and basic. If you want to increase your speed, you gently increase the pressure on your pedals or "lean on your pedals." To decrease your speed, you slightly decrease the pressure on your pedals or "soft pedal." On a track bike, you have a fixed gear so that when you pedal

forward you go forward and when you pedal backward, you go backward. A trackie has even better control because he can slow his bike more accurately by applying pressure to the pedals as them come forward or "kick back."

You can duplicate this on a road bike with a special braking technique I developed. I call it pedaling through your braking. You gently apply your brakes while continuing pedaling. Continuing pedaling while gently braking permits you to feel you speed while braking so that you don't slow down too much.

To be able to effectively control your speed with your legs, you must spin. If your cadence drops below 70 rpms, then your ability to maintain an even and constant pressure drops off radically. The absolute worst people for causing accordion effect in a paceline are big gear pushers with a low cadence. It is normally an absolute nightmare to ride behind a big gear pusher no matter where they are in the paceline. If there is a big gear pusher in a paceline, you can tell when he is not in front of you because the accordion effect stops or decreases. The best cadence for effective pace control with your legs is between 80 and 100 rpms.

On flat ground, you should be able to ride within inches of the wheel in front of you for miles without touching your brakes. With a group of experienced riders using proper technique on flat ground, you should be able to ride a paceline for eternity without touching your brakes. That is the ideal paceline.

To have the same smoothness and pace control on rolling topography, you have to use pedaling through your braking. On down hills, gently brake while continuing to pedal to keep an even distance between you and the rider in front of you.

It is important to understand that, as you start to climb a hill from the flats, you **MUST** increase the pressure on your pedals to keep from slowing too fast and forcing the riders behind you to brake. The best way to go from the

flats to a hill is to carry your momentum on the hill by increasing your pressure on the pedals as the grade increases. This way, if your speed drops, it will happen slowly permitting the riders behind you to control their speed changes by soft-pedaling and not by braking.

Most riders make the mistake of slowing to change gears before the hill starts. It is much more energy and time efficient to carry your momentum as far up the hill as possible by learning to shift on the hill. Contrary to what most people teach you, you can shift on even a steep hill with practice. The reason most people don't think you can change gears on a hill is because the extra pressure on the chain caused by climbing prevents the chain from moving from one sprocket to another one.

The technique for making a shift on a climb is simple but requires practice because the timing is crucial. You continue carrying your momentum on the climb while slowly decreasing in speed as the grade takes the momentum from you. When you reach a point that you know you will have to shift in the next 10 to 15 meters, you first accelerate slightly by leaning lightly on your pedals, place your hand on your shifter, and shift as you decrease the pressure on your pedals (soft pedal) for one full stroke of the pedal permitting the bike to slow back down to the speed you were at before accelerating.

Soft-pedaling decreases the pressure on the chain while shifting which permits the shifter to carry the chain to another sprocket. You have to hit this just right so it does require practice. The time benefit can be very rewarding. On a significant climb, you can literally gain minutes on people who slow to shift before the climb by carrying your speed as far up the hill as possible.

I have used this to increase my distance while on a solo break and win a race. On one five-mile climb, I gained over three minutes on a stronger climber by carrying my momentum over the climb. It really saves your legs

in a long hilly race. I have seen pro's carry their big chain ring on some decent sized hills by using this technique. I have set and swapped war stories with riders like Steve Woods about how easy it is to gain a lot of time on riders who don't know how to carry their momentum on a climb. Practice it.

Proper Swing Out

Most of the mistakes made in paceline come in the transitions. The most significant transition is the "swing out" or when you change lead riders. There are a number of parts to this change and, therefore, a number of mistakes, which are common. Most riders do poorly with the swing out.

The proper technique is as follows:

When making the change, the front rider swings out and **THEN** slows down to permit the rider behind to maintain a smooth and steady pace while pulling through. His swing out should be sharp and quick to let the rider behind him know that he has swung out. He should only swing out just a little more than necessary for the rider behind to pull through. This is so he can side draft the riders as they come through further decreasing his workload as soon as possible and maximizing his conservation of energy.

When he gets two riders from the back, he should look back to make sure the last rider either did not get dropped or is not about to get dropped. This also permits him to mentally time his next move. When his front wheel is behind the pedal of the last rider in line, he should begin accelerating slowly and cut a diagonal to where he wants to be behind the last rider. When he reaches the point where he wants to be behind the last rider, he should be traveling at the same speed as the last rider.

All of this is done by using your legs for speed control.

The Most Common Mistakes

There are a number of common mistakes made by most riders when they swing out from the front of a paceline. First, they tend to slow down before they swing out which causes the riders behind them to either brake or swing out to go around them. This breaks the integrity of the paceline.

Another mistake commonly made by most cyclists is to not slow down after swinging out so the next rider can maintain a steady speed and pull through. This causes many riders to jump to pull through which opens a gap on the rider behind him. That rider is then forced to jump to a higher speed than the first rider to close the gap. This forces the second rider to work hard when he should be resting.

Jumping to pull through dominos through the paceline forcing everyone to work when they should be resting. This is one of the worst things you can do to a paceline and destroys the integrity of the paceline because each successive rider is forced to work harder than the rider in front of him to catch him.

In the 1984 Summer Olympics, the West German pursuit team clocked the fastest qualifying time and was easily favored to beat the US team in the finals. Two of the German riders were clearly stronger than their two teammates. In the finals against the US, when those two weaker riders swung out, the other two riders would jump to increase the speed. This caused the two weaker riders to have to chase when they should have been resting.

It wasn't long before the two weaker riders fatigued and got dropped causing the team to lose because the time is taken on the third rider. They were so much faster than the US team that, if they had simply maintained the integrity of their paceline, they could have easily won. Even the best pacelines must be smooth and steady.

If you want to increase the speed of a paceline, you do so by slowly increasing the pressure on your pedals so that no holes open behind you and the riders behind you don't have to jump or chase. They simply sense your wheel moving away slightly and have plenty of time to lean on their pedals to maintain the same distance. To slow the pace, you simply soft pedal letting the pace slowly fall so the riders behind you can slow fast enough by soft-pedaling.

Most of the time, if you are significantly stronger than the other riders in the paceline, you maintain the maximum speed for the GROUP by you taking longer pulls and them taking shorter pulls. If you are not all on the same team, then you have to be careful to not do so much of the work as to fatigue yourself enough more than the other riders fatigue themselves so that they become "stronger" than you and beat you. This is a balancing act.

Another common mistake made by riders when they swing out from the front of a paceline is to swing out too far. This causes two things to happen which decrease the potential performance of the paceline.

The first is that the rider who swung out continues to get the full force of the wind until he reaches the back of the paceline and returns to the draft. This means that this rider is working harder than he should and will fatigue sooner.

You must remember that the draft is not completely behind a rider. As a rider moves through the air, he creates a draft wake just like when a boat moves through the water. The draft that extends out to the side of a rider is that rider's side draft. If the direct draft of another rider decreases your workload by 30%, then the side draft of that rider will decrease your workload by about 10% to 20% depending where you are in that side draft.

The second thing is that your side draft helps the other riders as they pass you. This is particularly important for the first rider by you. If you swing out enough to deny the second rider your side draft, he goes from 30% less work to full force in an instant.

This sudden change in work load makes it impossible for him to accurately maintain a smooth speed and the tendency is to increase his pressure on the pedals too much or jump breaking the integrity of the paceline.

On the other hand, if he can side draft past you, the workload change is more gradual and he can increase his pressure on the pedals gradually and in a more controlled manner. This maintains the integrity of the paceline.

The next mistakes made by most riders after they have swung out are at the back. First, they fail to anticipate a rider having been dropped and may find themselves accelerating too late and also being dropped. Look back before the last rider gets to you so you can be sure his wheel is still there.

Next, most riders make two mistakes in returning to the paceline. First, they wait until they are behind the last rider before they start accelerating.

Basic physics and common sense should tell you that by the time they get up to the speed of the last rider, they will be one to two lengths behind the last rider and have to chase when they should be resting. Second, they cut a square corner to get behind the last rider, which increases their workload while accelerating back up to speed by not fully utilizing the draft of the rider ahead of them.

Let me go back through the steps for returning to the paceline in more detail. First, you start accelerating when you are still overlapping the rider you want to get in behind. To do this and not get hit by the rider in front of you who is also falling back, you start accelerating when your front wheel is

behind the pedals of the last rider so you can begin moving closer to that rider as you fall back.

By the time the rider falling back and in front of you would make contact with your front wheel, your front wheel will be between his back wheel and the back wheel of the last rider. You continue this action until you are directly behind the last rider and should arrive at the desired drafting point at the speed of the rider in front of you so that you don't have to chase. You just cut a diagonal instead of a square corner.

By doing this, you were increasing your draft while accelerating which saves you energy and you don't have to chase, which saves more energy. This takes practice but really works.

Back at the front, what are the most common mistakes of the second rider who pulls through after the rider in front of him swings out?

The most common mistake is to judge his pace while pulling through on the speed of the rider he is passing. This commonly causes him to either slow down with that rider or jump to get past him. Both of these destroy the integrity of the paceline by changing its speed.

When passing the rider who was in front of you, you must ignore that rider and focus internally on your own speed and cadence. This is the only way you will be able to maintain the paceline speed and integrity. If you want to accelerate the pace, wait until the rider in front of you is out of sight or you will have a tendency to accelerate too quickly. You must learn to control your speed internally with your legs and your feet and not based on external criteria.

If you are behind the rider pulling through, you have options to maintain the integrity of the paceline. If the rider pulling through jumps, you simply yell

at him not to jump. If this doesn't stop him and you have plenty of time left in the race, let him go and maintain the integrity of the paceline.

What will happen is that he will ride hard off the front of the paceline thinking he is towing the pack, swing out in front of the paceline, realized that he wasted his energy by towing no one, his legs will be tired from his effort, he will get mad, head up the road, blow up, and get caught and dropped. If the rider pulling through slows down, yell at him to not slow down. If this doesn't work, tow the paceline around him and the rider who swung out.

Sometimes, you will have to teach other riders how to ride while racing. My riders would often tell me after a race that they had been on a break with the pack breathing down their backs while trying to teach others how to ride paceline. This was most common in the lower categories. The pros don't even bother if you have not learned how to ride paceline properly by the time you become a cat 2. They either drop back to the peleton or drop you back to the peleton.

When you swing out, which side do you swing out to?

Most of the time you swing out into the wind. There are a number of exceptions to this. If there is no wind, you have a head wind, or you have a tail wind, you swing out to the middle of the road for the country you are racing in. If they drive on the right side of the road, you swing out to the left and, if they drive on the left side of the road, you swing out to the right.

If you are running an echelon because of a side wind, all you have to do is slow down and slide back. If the rider along side of you slows with you, coast and tell him to pull through.

On some courses such as winding or Criterium courses, there may not be enough room to swing out to the appropriate side so you swing out to the

wide side of the course. For example, if you are riding close to the right gutter in a Criterium, you swing to the left. The pack may be strung single file even with a side wind. Know the standards and then use your head.

The Lead Rider

The lead rider has a number of responsibilities. The first and most important is to maintain a steady pace. Second, he is the eyes of the pack and must safely guide the other riders down the road.

Don't ride up to an object and suddenly swing out just before reaching it. The riders behind you will hit it. You take a more gradual line around the object by aiming to where you want to pass it as soon as you see the object. Be sure to point toward the object and yell its name or something like "glass" to warn the rider behind you.

Everyone in the paceline should point and yell because a rider behind you may not see and hear the rider in front of you. This is a professional courtesy. You may be in front now but they will soon be in front of you. We must take care of each other out there. The sport is dangerous enough without us intentionally trying to harm each other.

With a standard paceline, you should do about 25 strokes on the front. That is 25 revolutions of one crank arm. If the distance to the finish is short and you want to run a faster pace, you decrease the number of strokes so you can increase the speed. You also vary the number of strokes depending on relative strengths. You may not be able to do as many strokes on the front and maintain the speed of the rest of the riders. With experience, you will learn to tell how long of a pull you should take by feel.

The fastest paceline is run for short distances and is called a rotation. The smallest pack you can effectively do a rotation with is six riders. If you have fewer than six riders, none of you will be able to get enough rest in the

paceline if you run a true rotation so you will have to spend at least a little time on the front.

With a rotation, you swing out as soon as you are clear of the rider who was in front of you and slow down so the rider behind you can pull through. The better riders know to gradually start moving to the side as soon as the rider who was in front of you has his front wheel behind your pedals so you will be out of the way of the rider behind you just as soon as possible. You are cutting a diagonal on the front. You should have two lines of riders. One line will be moving forward and the other dropping back. Since you will be wheel to wheel, it is also important that you learn to cut a diagonal on the back as I explained above.

Also, when you are the lead rider, you must focus on doing your job and only be aware of whether the riders behind you have been dropped. Don't try to do their job for them.

Survival

You may be in a race, on a training ride, or in a recreational ride and not be able to pull through knowing that, if you take a pull, you will become too tired and blow out the back. But you don't want to destroy the integrity of the paceline.

I developed a technique for this, which I call survival paceline. You can use this also as a gatekeeper. The technique is not difficult and is based on normal racer instincts and habits.

When a rider falls back, he looks back to make a visual and mental contact with the back of the paceline. He normally does this when he is about one and a half lengths in front of the last rider or half a length ahead of the next to last rider. At this time, he has made a mental note to begin accelerating when he drops back to where only his front wheel is still overlapping the last

rider. If you drop back to let him in and yell take it, he will be surprised and may not be able to get accelerated in time to fill the hole between you and the next rider in front of you.

Then you will find that both of you are chasing and this could cause one or both of you to get dropped. Especially if you are particularly tired or about to blow and it is the first time you wanted him to take it.

To avoid this, you simply swing to the opposite side of this rider just before he would look back. From this point you will still be able to get his side draft and he won't see you so he will plan to take the wheel of the rider in front of you. You also yell, "take it" the first one or two times each rider drops back to insure that he knows to take the wheel.

As he drops back to take the wheel of the rider in front of you, you slow and follow his wheel back. About the time this rider has reached the drafting spot behind the rider who was in front of you, it will be about time to swing out for the next rider. If you do this right, you will be steadily dropping back in a smooth rhythmic manner.

Think about it, you will be steadily traveling slower than the paceline and staying with them because they will be filling in the hole in front of you. You will be able to travel a little slower than the forward part of the paceline and get there at the same time which will make it easier for you to get home. At the same time you will not disrupt the integrity of the paceline because you will be riding around it.

This can be used as a team tactic. It is understood that, if a team has two or more riders in a break, at some point one of them will stop working to save himself for an attack or the sprint while his team mate(s) do his share of the work to make sure the break doesn't get caught. He can use this survival technique to rest at the back and not interfere with the integrity of the paceline.

The Echelon

The echelon is a paceline in a side wind. The lead rider must ride to the side of the road where the wind is coming from so the other riders can draft him. This is where it helps to be able to control your speed with your legs and by feel. That feel of effort will help you find the draft pocket. It will be the point where you are traveling at the same speed as the rider next to you with the least effort.

The change off is a little more complex. The lead rider only needs to slow and fall straight back so he can side draft. A common mistake here is riders fall straight back until the last rider is ahead of them and then jump and make a square corner. As soon as you are clear of the rider who pulled through, you should start cutting a diagonal across the back of the echelon.

If you do this, you will find that you will still get a little "side draft" at the back of the echelon and save energy. You keep this diagonal until you are directly behind the last rider, then you simply accelerate up into his draft pocket.

As soon as the lead rider drops back clear of the rider pulling through, the new lead rider should move as far toward the wind as he can to make room for the other riders to move over so the former lead rider can have enough room to get back on the echelon.

Since you are riding so close along side of each other in a side wind, you should understand why you need to learn to ride the straightest line possible as I previously taught you. The more disciplined you are in this skill, the safer you will be in an echelon. If you can't ride a straight line for long periods of time, then you don't belong in an echelon.

Turning Transitions

Almost all riders really blow this one and it costs against someone like me on a solo or a disciplined team break. Turning transitions are when your paceline changes direction in relation to the wind. Proper turning transitions need to be fluid and automatic or you will lose time.

Turning transitions is based on the idea that, as your position in relation to the wind changes, the position of the draft pocket changes.

Think of the draft pocket as being the umbilical cord on a space walk. If you lose hold of it, you are gone. The same is true for the draft pocket. If you lose hold of it, you may also be gone. At the very least, you will waste energy and lose time. Therefore, as the draft pocket moves, you should follow it.

The place where the most time is lost with this is on 180-degree turns. Here the riders tend to hold their formation until they come out of the turn and then look at each other wondering what to do. This hesitation will cost a pack at least 20 to 40 seconds.

Let's say that you have a wind from the left and are in an echelon going into a long left hand curve as in a circuit race. As the lead rider progresses to the left, the other riders should drift further and further back behind him remaining in their draft pocket. When they reach the point that the paceline is riding into the wind, the riders should be strung single file behind the lead rider.

If they continue turning until they are going in the opposite direction, then the leader needs to begin drifting to his right to make room for the others to draft on his left as he comes out. As they progress through this long curve, the following riders should follow the draft pocket up along side the rider in front of them. For this particular curve, the lead rider should come out of it

on the right hand side. The lead rider should not change during such a transition unless it is just a very long transition. Then you swing into the wind at that point. This way, no time is lost.

But let's say this is a short and sharp 180-degree turn as is common for team time trials. The standard technique used by all teams today is to make the lead change **in the turn** so that the lead rider coming out will be fresh and be able to accelerate even faster.

The way this is done is that the lead rider will go a little deeper than the other riders to let them pass him on the inside. If he times it right, he will be on the back coming out of the turn. If he doesn't time it right, he will either come back too soon and have to brake or come back too late and miss his wheel. Either way, he ends up chasing and, often, gets dropped denying the team a pair of legs.

I developed a different technique, which solves this problem. It requires a little mental discipline and practice. The leader change is made coming out of the turn in a way that actually increases the rate of acceleration.

The first key to this technique is for the lead rider to position properly coming out of the turn to open the door for the second rider to use the lead rider's side draft to increase the second rider's rate of acceleration. The rule is very basic for a left hand 180-degree turn. If the wind is blowing from you right going into the turn, you come out on the left. For any other wind direction, you come out on the right side of the road.

The second key to this technique is for the rider who is pulling through to simply ride around the lead rider using the lead rider's draft to help sling shot him back up to speed even faster. Both should be accelerating fast, it is just that the second rider is using the front rider's draft to accelerate even faster. The lead rider simply falls back and regains the paceline without getting dropped.

Using this technique, the team should accelerate about 10% to 20% faster. This technique also permits the team to automatically fall back into the right paceline formation without losing time.

Breaking The Break

How do you bring a break back in or slow a chase effort? **Simple, do everything I just told you not to do.**

Now, do you understand why it is so very important for you to not only know how but why when it comes to riding a paceline right? Hmmm.....maybe you should reread this chapter.

After all, if it is the most used tool in racing then it will be the most fought against tactic. Think about it. All team tactics are built around this fundamental principle.



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Part IV • Chapter Six

Professional Braking

Professional Braking

Most cyclists, including most pros, don't know how to use their brakes properly. They tend to either be braking as hard as possible or not at all. Most of the time they tend to be over braking.

There are too problems with over braking. First, you have to understand that the tendons, which pull your fingers down on the brake levers pass through the palms of your hands. In cycling, this has a tendency to create a problem.

When braking, the body's weight shifts forward into the handlebars. This causes the handlebars to transfer that pressure to the palms of the hands and against the tendons, which pull the fingers down. This has a tendency to do what we call shortening these tendons which causes the fingers to pull down even harder, which increases the braking, which shifts your weight more forward into the handle bars, which applies more pressure to the tendons in the palms of your hands, which....

Obviously, this creates a bad cycle, which can only be broken when your weight starts to come back out of your handlebars releasing the pressure on the tendons, which pull your fingers down. Since this cycle is normally broken only when you have slowed down enough that you are almost stopped and your body weight comes back out of your handlebars and into your saddle, then you only want it to happen in the most dire emergencies for which you must stop immediately.

Second, when your weight shifts forward into your handlebars that much, it destabilizes your bike causing you to lose control and forcing you to either pull very hard to the outside of a corner or restricts you from doing anything

but going in a straight line. You lose the ability to maneuver until you slow enough for your weight to properly return to the saddle where it belongs. Even for most emergency situations, you don't want this to happen.

For most emergency situations, you want to maintain control of the bike so you can maneuver through the situation. To do this, you need to learn how to properly brake.

You do this by what I call caressing the rims with the brakes. You apply the brakes just hard enough that you barely feel your weight **beginning** to shift into your handlebars but not enough for it to begin "shortening" the tendons in your hands. This means that most of your weight is still in your saddle and you can still maneuver the bike. You will find this to be a very valuable tool in a number of ways.

You need to practice this braking while on training rides. You can practice it several ways.

First, you simply apply pressure to the brakes while continuing to pedal so you can feel the speed change with your legs. I call this pedaling through your braking. You practice different braking pressures to see how much braking pressure you can apply before it shifts your weight into the handle bars enough to effect your control on the amount of braking. You need to get very good at this so that it becomes instinct.

Second, any time you come to a stop such as at a stop sign or light, continue pedaling through your braking. This also teaches you to better control your braking. Learn to increase and decrease your braking action while stopping.

One of the places where improper braking causes the most problems is in a pack or a paceline. It is very common for a rider to run up on a wheel, grab his brakes causing the bike to over brake, he loses too much speed and opens a gap in front of him, jumps to close the gap, and as soon as he is

about to over run the wheel again, he grabs his brakes too hard again. This is a common cause of accordion effect and crashes.

There are two proper things you can do to prevent this. One is proper braking action and the other is proper pedal action. If you do find yourself running up on a wheel, pedal through the braking action while caressing the rims with your brakes. This permits you to feel the speed of the bike and let you better control the decrease in speed until you have brought the speed of the bike down to the speed of the bike in front of you and not opening a gap.

It will keep you from dropping below the speed of the bike in front of you. As always, practice while training. This can also be a very valuable tool while descending in a pack.

The pedal control technique is the prevention of the problems in the first place but it is also very important for you to practice both techniques because there will be times to use both. The pedaling technique is to simply decrease the pressure you are applying to the pedals, as you get closer to the bike in front of you. This causes your speed to gradually decrease to the speed of the bike in front of you as you close on it. You want to achieve the speed of the bike in front of you just as you reach the point where you want to be behind the bike in front of you. Again, practice makes perfect.

Learning to better control your braking action by caressing your rims will solve some of your cornering problems. Most people will tell you that you cannot brake at all in corners. This is because they never learned how to caress their rims and have a tendency to over brake. Remember that over braking shifts your weight forward, which destabilizes the bike in corners.

For proper cornering, you need to have your weight properly in your saddle and not in your handlebars. With braking, you can only achieve this by caressing the rims.

One particular situation that roadies face with this is when they go into a blind curve and find that it has a descending radius. This means they may be going the right speed for the first part of the curve but too fast for the rest of the curve.

I have found that by caressing the rims, you can maintain the stability of the bike and decrease the speed of the bike to match the decreasing radius of the curve because you really only need to decrease your speed a little to match the decrease in the radius of the curve. This is very important on down hills where, if you lose too much speed, you can lose minutes and crashing can cause you to lose months of racing from broken bones. You must develop this skill to a fine art. Your braking must be smooth and steady.

Another very important rule is to use both brakes in braking. Just using the front brake destabilizes the bike and you tend to find yourself going over the handlebars. Just using the rear brake will cause your rear wheel to lock and lose traction when your weight shifts forward off of it. This skidding will cause the rear wheel to pass the front wheel especially while going down hills. It makes for very exciting riding and can break bones.

Believe me, you don't want to find yourself descending some hill backwards. No fun.



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Part IV • Chapter Seven

Pack Safety

Pack Safety

It is very unfortunate that almost all racing and touring programs consider pack safety to not be worth discussing. This is in spite of the fact that the single most often given reason for leaving the sport is that people are tired of crashing.

The truth is that most of those crashes do not have to happen and would not happen if all racers and recreational cyclists were properly trained in riding and racing skills and habits. There are even a surprising number of pros that have bad riding habits, which cause them to crash much more than really necessary.

In this chapter I will cover three basic aspects, which will make the sport safer for you if you pay attention to the details.

Standing Start

It sounds very simple but you would be surprised how many crashes take place in the first 30 meters of a race or how many people are dropped and eliminated because they did not get a good start. The first and most important rule for a standing start is to ride a straight line. You are packed so closely together at the start that just a little lateral movement can cause a crash.

You need to look and focus up the road before the start and then take a brief look at your pedal to get a mental image of where it is as you start forward. You should be able to get your cleat into the pedal with only a brief look. If

you look at the pedal too long, there is a natural tendency to swerve to one side.

Another key rule to having a good start is to accelerate smoothly with the peleton. If you don't accelerate with the peleton and are in front of other riders, you cause chaos and the potential for a crash as they try to squeeze around you in a slow moving and unstable peleton. Therefore, it is very important that you manage to move smoothly (there is that word smooth again) with the peleton and not cause chaos.

Unfortunately, some of the quick release pedals tend to spin if you push down on the opposite pedal too hard at the start so you have to learn how hard to push down to get maximum acceleration without causing the pedal to spin. The pedal spinning will cause you to miss foot entry and force you to focus too much attention on getting your foot in the pedal.

This is important because, if you slow below a certain speed, the bicycle becomes less stable and you will begin to wobble and become dangerous. If you begin to slow too much, you must pedal again with you starting foot to get your speed up before continuing to attempt getting your foot in the pedal.

It should be obvious that this requires practice. Therefore, you should practice at stoplights and stop signs when ever possible. Practicing your track stand is good but you should also put your foot down at some lights and practice your standing start. The more automatic this becomes, the less likely you are to have a bad start.

Over Lapping Wheels

The single most common cause of accidents is overlapping wheels. Now, it is impossible to move through and with the peleton without overlapping other

riders but there is a difference between overlapping riders and overlapping wheels.

Generally speaking, if your wheel is less than one foot to the side of the wheel of a rider and is overlapped, that is overlapping a wheel because you must leave room for riders to do some small lateral movement for their own safety. If you are a foot or more to the side of a wheel and overlapped, that is overlapping a rider because that much lateral movement is not acceptable within a peleton except in emergencies.

In other words, if your wheel is less than a foot to the side of a wheel and it gets hit knocking you down, then it is your fault. But if your wheel is one foot or more to the side of a wheel and the rider in front of you hits it knocking you down (except in missing a crash) it is the fault of the rider in front of you for riding erratically.

Keeping this in mind, it must be stated that your front wheel is your responsibility. The race is in front of you and you must be able to focus on the race.

Therefore, you cannot be expected to be constantly watching the wheel behind you. You are responsible for riding in a smooth and predictable manner, which promotes safety. Ultimately, barring erratic riding by the rider in front of you, you are responsible for your own front wheel. Take care of it and it will take care of you.

When passing or riding on the hip of another rider, it is good to be cautious. I taught my riders to always expect the stupid because you don't know the bad riding habits of other riders. This attitude means that you are more likely to react properly when someone does do something stupid. By expecting the worst from riders you don't know, then you only have good surprises. I hate bad surprises, especially if it means crawling on the asphalt at 35 mph.

If, for some reason, you are a little uneasy at passing or riding on the hip of a rider or just feel a little caution is necessary, it is acceptable to touch that rider on the hip with the back of your hand saying with the touch, "I am here." Even the pros do this occasionally.

Some of the less experienced riders will get upset at this so be ready for some irrational reaction. This is especially true for riders who are afraid of being touched and crashing. They are riding scared and are dangerous in a peleton because they tend to over react to riders near them. They will need to practice the contact riding I will discuss in another chapter.

You can also talk to the riders near you. You will often hear riders, especially in less experienced packs, saying things like on your left, on your right, inside, or outside. This is most common when cornering.

The pros have learned that someone will probably be there and just ride as if they are. They also seem to develop some sense of nearness. This may be because of subtle sounds like breathing, tire movement on the road, and the sound of the chain tracking over the gears. Most of the time, they know when someone is on their hip. You would be amazed at how much cycling improves your senses.

Using Your Eyes

This is something that most athletes never learn and is a very valuable tool to not only promote safety but to also increase your winning potential. First, for safety.

One of the biggest mistakes made by racers in a pack is to sit looking directly at the wheel in front of them. This is especially true for beginner to intermediate racers. They never take their eyes off the wheel in front of them. Because of this, they tend to follow that rider wherever he goes, even

down in a crash. By the time they realize that the rider in front of them is slowing down, they have hit that rider's rear wheel.

You must learn to use your eyes and vision correctly to improve your safety and racing potential. First, you need to learn to use your peripheral vision. This is one of the skills which helps to make great athletes great because they see things most athletes miss.

You use your lower peripheral vision to watch the wheel in front of you and your side peripheral vision to monitor any movement to your sides. You should be able to watch the wheel in front of you and only occasionally look down to check yourself. Your main vision should be used to monitor the action ahead of you and the riders in front of you for safety and to read tactics. This is the single biggest secret why pros can ride so safely and still read tactics ahead of them.

Practice using your peripheral vision before the race. You can do this while on training rides or just walking around. You do this by looking at an object and being aware of other things, which are in your side and lower peripheral vision. This needs to be practiced to the point of becoming second nature. You really need to learn to be aware of the position of the wheel in front of you using your peripheral vision while on training rides. This keeps your main vision free for reading the pack.

Being able to see up through the peleton makes it possible for you to see things that are happening ahead of the riders in front of you. It should only be common sense that the things the rider in front of you will have to brake for or may hit will be in front of him. Looking up through the peleton makes it possible for you to see such problems sooner and increases your reaction time for avoiding these problems. It greatly decreases you probability of crashing.

Because of this, I have ridden through dozens of crashes that took down people in front, along side, and even behind me.

This basic principle is what makes it possible for pros to ride more smoothly in the peleton. When the riders at the front of the peleton slow down, you can see it rippling through the peleton towards you and can simply slow with them by soft-pedaling instead of having to suddenly slam on the brakes. When the riders at the front accelerate, you can also see it ripple through the peleton toward you and this permits you to begin accelerating sooner and more smoothly with the peleton.

These actions not only increase your safety, but help you save energy by riding more smoothly in the peleton. Watch the pros in a Criterium when a rider attacks several riders in front of them. They all stand up to counter attack in unison. This is because they are not staring at the wheel in front of them and are looking up through the group.

If you are smaller than the rider in front of you, you can do one of two things to increase your safety. First, you can side draft and look along side of them to see in front. Second, you can look up under the rider in front of you to give you a little extra reaction time for things on the road.



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Part IV • Chapter Eight

The Law of The Pack

The Law Of The Pack

In bicycle racing, as in many other sports, it is not unusual to hear about "cloak and dagger" tactics.

Most of the time, these stories come from the media who are trying to sensationalize the sport or a story to increase spectator interest and their profits without concern for the effect these stories will have on the sport. Or they will come from racers who never quite made it and are trying to impress less experienced racers with their "daring do." These stories are meant to impress people by showing how dangerous it is at the "top" and how tough the storyteller is.

Unfortunately, these tactics are all too often picked up by less experienced coaches who have never been to the professional level and don't know many team tactics, so they teach new riders to cheat and endanger others to win or the tactics are picked up by less experienced racers themselves.

The truth is that the only people who really use cloak and dagger tactics are the less experienced riders and coaches.

At the top, the riders and coaches are few in number and, therefore, exist as a brotherhood or family. I still clearly remember when my team arrived at the top and began competing with the best pro teams in the nation along with internationally ranked riders, teams, and coaches. I was completely amazed at how warm the welcome was for us.

As the new kid on the block, we were taken by the arm and led around. We were taught tricks of the trade about how to make life easier, save money, and what to expect as far as rider and team protocols. We became part of the family of professional bicycle racing. It was a really great experience.

The only riders I ever saw that had anything resembling cloak and dagger tactics used against them were the inexperienced riders who either had bad riding habits, which were a threat to the pros or were still using the cloak and dagger tactics when they rode their first race at the top. These riders quickly got a lesson from the pros that would descend on them encircling the errant rider, screaming at him to never do that again, and sometimes beating on his helmet. He never did that again.

Fortunately, I had been taught the proper riding habits and protocols by people like John Vande Velde (Sr) who was ranked internationally and had considerable experience racing in packs with the best pro teams in the world and British Olympian, George Gamble, who had raced professionally in Europe. I trained all of my racers up from scratch teaching them the proper riding habits and team tactics. I trained every racer as if he or she were going to race pro. In fact, I received quite a few complements from some of the best pros around about how well my riders rode and raced in the pro packs. I was very proud of my racers.

Yes, it is true that occasionally a few riders will lose their tempers and do a little boxing during a race. But they are always quickly pulled from the race and disqualified. You see, there is not only this close brotherhood at the top but there is also a thing called the Law of the Pack.

The racers, coaches, and officials all know about the Law of the Pack. The good officials do their job as best as possible to deter the peleton from invoking the Law of the Pack because they know some one will get hurt.

In bike racing, there is a common understanding which requires a courtesy that prevents cloak and dagger racing. I may be in front of you, have the physical advantage over you, and be able to put you down or crash you now, but, the way a peleton moves, in a few minutes you will be somewhere in front of me and have the physical advantage over me.

Therefore, to use cloak and dagger tactics would quickly turn bicycle racing into a blood bath from which no one would escape without serious injury. To prevent this, we have a common understanding that I will not try to crash you if you will not try to crash me.

To violate this understanding is to pose a threat to everyone in the peleton. You have to understand that, if another rider will crash you to win, he will crash me and anyone else in the peleton. Therefore, if he will intentionally crash anyone in the peleton, he becomes a serious threat to everyone in the peleton, has violated the Law of the Pack, and action must be taken to protect ourselves.

The normal protocol for the Law of the Pack is to first report the errant behavior to the race officials. If the race officials don't take proper action, which is to enforce the rules to protect the rest of us and the rider continues his behavior, then we take further action. The second step is for a group of us to confront the errant racer in a civil manner. We try to reason with him.

If the errant rider refuses reason and the race officials still will not take appropriate action, then to protect ourselves, we invoke the Law of the Pack.

This is always as a last resort when all other avenues have been exhausted because it does mean that a rider is going to get hurt. Invoking the Law of the Pack means that every time that rider races, he will be tactfully crashed. It usually happens in a corner or he is placed into a stationary object like a telephone pole or parked car. Before he is crashed the first time, he is warned that he will be crashed every time.

You see, one rider in a peleton cannot out ride the other 99 riders. Unless you ride every race solo from start to finish, you will be behind or outside of other riders from start to finish in every race. You cannot win against those odds and will crash in every race.

The concept is very simple. If you will not behave and respect others in the peleton, then we will crash you until we drive you out of racing completely. Once the Law of the Pack is invoked, your racing career has just come to an end.

If a rider tries to bring his teammates to his aid and those teammates are experienced, they will refuse to assist the errant rider because they will know that even 10 riders cannot outride 90 riders. Their coming to the errant rider's assistance will turn racing into a blood bath from which none of them will escape injury. The pack will crash all of them until they all leave the sport and all of their careers are over. I have never known even one rider who would assist a teammate against the Law of the Pack.

In 1984, before I founded the Los Angeles Racing Team, I took over coaching a club in Los Angeles where I had the misfortune to find myself with a rider who kept crashing other riders.

To my surprise, the club didn't permit me to bench or dismiss the rider. The rider thought crashing other riders was funny and bragged about it. I warned him a number of times. He finally caused a crash in which three people were hospitalized. In his next race, he was told to quit crashing people, he cursed the riders confronting him, and was immediately crashed. He was informed that he would be crashed every time he rode after that. He tried to get me to commit the rest of the team to fight for him, and I refused. He never rode another race.

Learn to use team tactics instead of cloak and dagger tactics and learn to ride right in a peleton. If you don't, you will eventually pay a heavy price by being chased out of the sport you love and you better hope the race officials get you before the other racers do.

We don't tolerate that kind of riding in bike racing for very long. When you hear the macho cloak and dagger stories, take them with a grain of salt.



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Part IV • Chapter Nine

Following Switching

Following Switching

It is amazing that people still use switching in an attempt to drop a rider from their wheel. This assumes that the rider on your wheel cannot ride his bike across the road as fast as you can which is ridiculous.

There are really few instances in which I have seen it work to any extent and that is usually because of just catching the person by surprise or having a teammate setting next to him so he cannot follow you.

The truth is that most of the time, switching is dangerous and a waste of energy. I even taught my riders to use someone switching them to set up an attack against that rider. This is because, when a person is switching to drop you, they are attacking. If you stay with them through the attack, their legs get tired, and you can easily drop them by counter attacking.

I also taught switching by one teammate to set up an attack by another teammate. This is really simple and effective on a nice, wide Criterium or closed road course.

One teammate goes to the front of the peleton permitting them to get on his wheel, and attacks with a moderate intensity to the opposite side of the course. At the same time this rider attacks to the opposite side of the course, a teammate this side of the peleton attacks straight up the road.

For example, if the peleton is on the right side of the road and the front rider attacks to the left side of the road, a teammate on the right side of the pack attacks straight forward.

This works for several reasons. First, all of the riders in the peleton will tend to focus on the rider attacking on the front of the peleton to follow him across the road and will be less likely to see and react to the rider attacking up the road. Therefore, this is a diversionary tactic.

Second, it automatically increases the distance the riders in the peleton will have to ride to catch the rider attacking straight up the road giving him more time to get away before they can close the ground.

A good team can position about three or four riders on both sides of a peleton and use this technique to relay attack the peleton. This forces the chasing riders in the peleton to cover a greater distance with their chase efforts and tires them out more quickly.

I even taught my riders to use attacking straight up the road when a rider from another team attacks across the road for their own attack. If another rider makes the wrong move, use that move to set up you making the right move.

Following the Switch

Safely following the switch is pretty easy if you stick to some basics. Let's say you are on break with one other rider and he decides to attempt dropping you by attacking and switching at the same time. Most likely he is going to attack back and forth on the course several times.

You use the same technique used in basketball and football to defend another player who is trying to get by you. Let's say the rider is diving from right to left. You let him lead you to the left by about one foot so that you are looking up his right side and side drafting him. You don't try to stay directly behind him for two reasons. First, him being on your left gives your reaction time in the event that he decides to change directions. What will happen is that when he changes directions, instead of him being two or

three feet to your right and you out of his draft, he will only be one foot to your right with you still side drafting him.

Second, he is already doing something stupid and drastic to drop you, which means he may get even more stupid and try to drop you by illegally knocking you down by simply hitting his breaks. If you are directly behind him when he hits his breaks, you will probably hit his rear wheel and crash.

But, if you are just to his side, it will take very little movement to go up his side missing him. Plus, if you can't completely miss him, you will be far enough to his side that all you will have to do is put your left shoulder into the right cheek of his butt. This will knock him to his left, off his bike, and out of your way so that you don't crash. This should only be used for self-defense.

Also, it is important to follow a little farther behind a person when they switch while attacking. This gives you more reaction time for both following him and missing him. You should follow about a foot or two further back than normal.

The counter attack is very simple and always works with this technique. You simply follow the rider back and forth using the above technique while he is attacking until you feel his speed drop just a little telling you his legs are tired. You can now attack him knowing he cannot cover your attack.

Time your attack for when he changes direction so that he is leaning and moving away from you and will have to react back in your direction, which gives you more escape time. At this point, you attack straight up the road, which is the shortest distance while he is forced to go a longer distance with tired legs.

Dropping A Rider From Your Wheel

So, how do you effectively drop a rider on your wheel?

There are a number of techniques which, if done right, can work. The first technique I was taught was to fake a bonk. It is a technique derived from a strategy used by the Great Reg Harris in match sprinting. He used a double kick very effectively. Reg would jump into a sprint and stop accelerating prematurely causing the rider on his wheel to think Reg had miss judged his sprint and hit his top speed too early. The natural response is to jump around him and out of his draft. At this point, Reg would jump again winning the sprint.

The technique you would use on the road can be one of two basic ways. The first is to simply fake a bonk and slow a little so the rider on your wheel attacks to drop you. You immediately go to his wheel, wait for him to tire from his attack and counter attack.

The second technique is to do a partial attack, stop accelerating early, and drop your speed just a little sending the false message that you have tired. He will attack you, you go to his wheel, wait for him to tire from his attack, and counter attack.

On a Criterium course, you can break a little too hard into a corner. He will do one of two things. First, he will over break to a slightly lower speed to stay on your wheel at which time you immediately attack through the corner. If you time it right, you should be able to open at least two or three lengths before he can get back up to speed putting him out of your draft. Then it becomes a matter of speed and desire to win. In other words, who wants it the most?

Second, he will come around your outside to miss hitting you permitting you to get into his draft and turn the table on him. He may try to attack you as

you go to his wheel at which time you wait for his attack to finish and counter attack.

Then there is always the match sprinting technique you can use if you have enough of a lead on the chasing riders. You pick a slightly up hill grade on the course. As you start onto that uphill grade, you do the quick shift by hitting the shifter changing from your large chain ring to the smaller one and grabbing your breaks before he can shift.

He will do one of two things. First, he will try to attack by you. Being in the smaller gear, you will be able to out accelerate him long enough to make his wheel and quick shift back to the big chain ring. When he tires from his attack, you counter attack.

Second, he will brake and quickly move to one side to keep you from getting on his wheel. This will put him in a track stand on a slightly uphill grade in his large chain ring while you are in the small chain ring. You will have enough greater acceleration to open several lengths before he can get back up to speed putting him off your wheel.

I used this technique once and gained a good 20 to 30 feet on the other rider before he could get back up to speed and his chasing teammate could get close enough to be much of a threat. I won the race with a solo because he couldn't figure out whether to chase me or wait for his teammate until it was too late.



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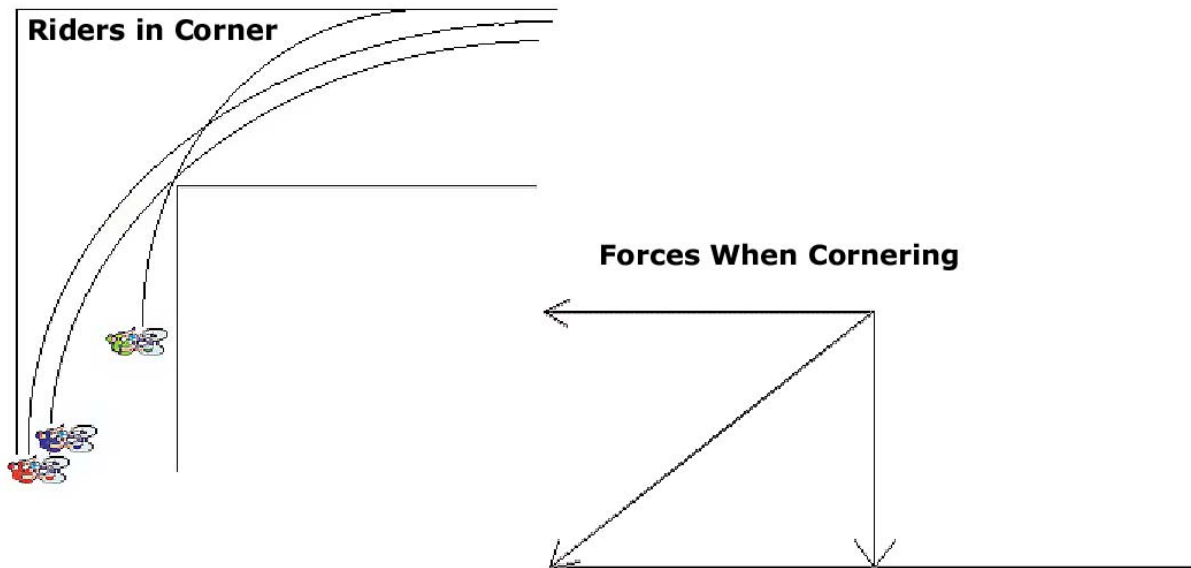
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Part IV • Chapter Ten

Cornering

Cornering

First, take a look at the picture below. I will refer back to this picture throughout this chapter.



For reference purposes concerning the cornering picture (Riders in Corner), the red cyclist is the one on the far left, the blue cyclist is the one in the middle, the green cyclist is the one on the far right, and the lines represent their lines through the corner. The picture is meant to represent three cyclists taking a right hand corner.

The picture with the arrows or vectors (Forces When Cornering) is to help you understand the basic forces involved in cornering with the bottom line being the ground or road. I will refer to the horizontal (pointing left), vertical (pointing down), and diagonal (pointing lower left) vectors. Remember that the length of a vector shows the speed or amount of force while the direction

of the vector shows the direction of the force or object. Please familiarize yourself with the two pictures before continuing.

In this Chapter, I am going to teach you a scientific and common sense approach to cornering. I am going to stress the does and don'ts of cornering along with common mistakes I have seen in cornering. I have found it amazing that some of the mistakes I have seen have worked their way up into even pro racing. It seems that experience alone is not an adequate teacher.

Please pay close attention to the details. This lecture is crucial to everyone in cycling even if you believe you know all about cornering. You may be making mistakes without knowing it and even little mistakes can put you down.

Let's start with the picture in the lower right corner. The vertical vector is representing the force of gravity pulling you down. When you are riding in a straight line on flat ground, there are only two basic forces acting on your bike (this is excluding wheel turn etc.) Those two forces are gravity pulling you down toward the ground and the kinetic energy keeping you moving forward.

In this position, you keep your center of gravity over the centerline of the bike to keep the bike vertical and going in a straight line. If you move your center of gravity to either side of the centerline of the bike, the bike will lean in that direction. If you place a pedal at the bottom of its stroke and place all your weight in that pedal, the leverage of the pedal will cause the bike to lean and turn in that direction.

Most people mistakenly believe that you control the direction of your bike with your handlebars but the truth is that you move your handlebars very little except at very slow speeds when you cannot lean much. You actually control the direction of your bike with your saddle. By causing your saddle to

move left, you cause the bike to lean left, which causes your bike to turn left.

You should know this from walking with your bike and only holding it by the saddle. You can make your bike go where you want by leaning the bike with your saddle. When you are racing, you do the same thing except instead of leaning the bike with your hand, you are leaning it with your center of gravity.

THEREFORE, (and this is a big therefore) the control of your bike during a race is determined by your center of gravity (placement of your weight) in relation to the centerline of the bike. Don't forget that.

At this point it is important to understand a basic principle of physics which states that an object in motion will remain in motion at a constant direction and speed unless acted upon by another force. Don't forget that either.

When you lean the bike to the right, the shape and rotation of the side of the tire brings into play another force acting on your bike, which causes it to turn to the right. The geometry of your tires rotating downward in relation to the surface of the road brings friction force into play. This friction force comes into play **PUSHING** your bike to the right.

Suddenly, you have two different forces acting on you and your bike other than kinetic energy. You have gravity pulling you down, the vertical vector, and centripetal force pulling you to the left (while you are turning right), the horizontal vector. Any time you have two forces acting on an object, in this case your body, the combination of those two forces creates a third vector, the diagonal vector.

The length and direction of this vector is determined by the relative lengths and directions of the other two vectors. Since gravity remains constant on flat ground, then the variable is the centripetal force but it will only vary in

intensity. As the centripetal force increases in intensity, it causes the diagonal vector to increase in length and become more horizontal. As the centripetal force decreases, the diagonal vector shortens and becomes more vertical or in line with gravity until it equals gravity when you are riding in a straight line.

If you find this confusing, read it again and again until you understand it. It is important that you understand this so you can figure out when someone is telling you something wrong about cornering.

The diagonal vector represents the combination of the other two forces which, to make it easier to remember, I call it your **racing gravity**. I call the direction that this vector is pointing your racing down, or the direction in which your racing gravity is pulling you.

At this point, common sense should tell you that you must keep the center line of your bike in line with your racing gravity and you must keep your center of gravity or weight placement so that the center line of your bike is directly between your center of gravity and your racing down. If you move your center of gravity to either side of the centerline of your bike, your bike will move in that direction.

While cornering to the right, if you move your center of gravity to the left, either your bike will set up and you will stop cornering or you will flip off of your bike to your left. If you move your center of gravity to your right, either your bike will lean more causing the bike to turn harder or the bike will lean too far causing the tires to lose traction, you will go horizontal with your bike, and crash.

I regularly hear and read riders being told that they should put their weight in their outside pedal when cornering. By this point you should understand that if you put your weight in your outside pedal when cornering, it will cause your bike to set up and you will either stop cornering or crash.

Then why are you being told to put your weight in your outside pedal when cornering?

It is very simple. These people, when cornering, feel pressure on the bottom of the outside foot when cornering and mistakenly take this to be their weight being shifted to that foot. Actually, they are keeping their weight over the center line of the bike and putting pressure in their outside pedal.

There are two proofs that you are not putting your weight in your outside pedal when cornering:

(1) Lean your bike in a standing position against something while standing next to it. Put your foot on the outside pedal with the pedal at the bottom and push down hard with your weight but not too hard (you don't want to hurt yourself.) Your bike will quickly slap upright against your leg.

(2) If you are pedaling through a corner, how can you be putting your weight in your outside pedal? It should be common sense that you cannot pedal with all your weight in one of your pedals.

If you think about what is happening while cornering in relation to physics, you will find that you are instinctively doing something interesting. You are keeping your weight over the centerline of the bike in relation to your racing down and racing gravity to hold it in the proper position for cornering **AND** you are torqueing the bike tires into the ground to increase your traction to keep it from sliding out.

Pay close attention to **BOTH** your hands and feet.

You will find that you are pulling up on the inside handle bar and pushing down on the outside handle bar to force your front tire hard into the ground.

The pressure on your outside pedal is meant to help force the rear tire into the ground.

Therefore, the proper cornering technique is to sit on your saddle, relax, torque the bike just a little to cause the tires to bite, and let the bike arch through the corner. Your upper body and head should drop lower and toward the inside so that your head will be just about over the inside brake lever. This is to better position your center of gravity on the bike in relation to the centerline of the bike. It is also important to keep a smooth arching line through the corner. Bobbing and weaving will throw your line off. It is just that simple.

Oh, did I say relax? Yes, because tensing up will cause you to pull the bike to the outside, losing control, and forcing yourself to brake to regain control.

Remember what I told you about the word relax being one of the most important words in cycling? That is very true in cornering. If you tense up while cornering, you tend to push your center of gravity away from the corner or toward your outside. This causes you to pull hard to the outside and can easily cause you to crash. Therefore, it is crucial that you practice cornering until you learn to instinctively relax while cornering.

It is the single most important thing most people can do to improve their cornering.

In a later chapter, I will teach you drills you can practice to teach your subconscious mind to gain the confidence required for you to be able to relax while cornering. You should practice these drills on a regular basis for the rest of your racing career. If you do, you will reach a point to where cornering feels great and is fun. Then you will really love roller coasters. :-)

Let me teach you a technique for helping you relax for corners. You will find that when you tense up, you grip the handlebars very hard. This causes your

forearms to tense up because the muscles, which control your fingers, are in your forearms.

In order for your forearms to tense up, you have to brace them by tensing your upper arms and to tense your upper arms you have to brace them by tensing your shoulders. Just grab anything really tight with your hand and feel the muscles up your arm to your shoulder with the other hand. You will see that all the muscles are tense.

This tensing action causes you to straighten your arms and push away from the corner which causes your bike to pull toward the outside causing you to lose control. Therefore, to relax for corners, you simply relax your grip around your handlebars, which permits all the other muscles to relax.

Before you commit to the corner, let your fingers hang until the muscles up your arms relax and then gently wrap your fingers back around the bars just tight enough to have a firm hold on the bars. You will find that this little trick will make it possible for your entire body to relax which will improve your cornering.

Clearing the Corner

As you are approaching a corner, there are several things you need to do. First, you need to do what I call clearing the corner. What you are doing is looking as far into the corner and at the road surface to see if there is anything that can cause you to crash. You are looking for irregularities in the road surface, sand, water, rocks, and other objects like the bodies of racers who have crashed ahead of you. You should clear the corner before you lean into the corner.

After you have cleared the corner and just before you lean into or commit yourself to the corner, you look as far through the corner as you can. You will find that you and your bike will follow your eyes through the corner. If

you are looking at the road in the corner, you will tend to pull to the outside and lose control of the bike because it is too close to you to set the right line through the corner. If you can't see all the way through the corner, look as far as you can as if you can see all the way through it.

At this point, it is important for you to remember the lessons I taught you about how to use your eyes in a bike race.

Remember that you will use your center vision for what you want to be your main focus and use your peripheral vision to watch other things. When cornering, use your lower peripheral vision to monitor the ground searching for something you may have missed such as rocks, water, and sand while keeping your main focus through the corner.

This is particularly important when riding a blind corner you can't see all the way through. You keep your focus through the corner while constantly clearing the road with your lower peripheral vision as the road comes into view. This way, you don't lose your line in a blind corner.

Oops!!!

You are committed to a corner, part of the way into it, you suddenly find yourself in trouble. What do you do?

First, it is important to understand what happens if you don't react right. Your bike will lose traction with the ground, you will suddenly lose all that nice friction force which is pushing you through the corner, you and your bike will suddenly go horizontal, and you will immediately move in a straight line towards the outside of the corner at high speed.

This will happen so quickly that the riders on your outside will not have time to react much less get out of your way. You will cut under them, taking their

bikes out from under them, and crashing them. This all happens in a split second.

The proper reaction is to set the bike up in a straight line, slam on your brakes, and bring the bike to a stand still or back under control. This sounds drastic but is the best thing to do when you have just had something happen which is causing you to crash because it keeps the bike under you and the people on your outside will keep their bikes under them, it also permits all of you enough time to straight line your bikes and grab your breaks, and it keeps you reasonably under control. Watch the pros. They often use this technique with not one person hitting the ground even with a rolled tire.

How do you do this? Just as soon as you feel the bike start to go, you kick your hips to your outside in one quick move. This stops the cornering by straightening the bike up and brings you back on top of your bike with your wheels down.

By the time your bike has straightened up, you have had more time to react to braking than it would have taken for you to knock down the first rider to your outside. This has permitted the rider on your outside to have enough time to react, straighten his bike up, and hit his brakes. You just saved two or more riders a lot of skin.

It is very important that you not use this technique as an out for panic. If you are not comfortable in a peleton while cornering, you didn't do your cornering drills and should go to the back of the peleton to practice following the pack through the turns until you feel comfortable leaning through the corners.

Now, let's say you are on a fast down hill in a blind curve. Suddenly, you see sand in the corner. **DON'T PANIC!!!** First, lightly hit your brakes just enough to feel your weight shift forward a little bit. This will decrease your

speed enough that you can take a sharper line through the curve, which you will need after your next move.

Second, just before your front wheel hits the sand, release your brakes and set your bike up in a straight line until after your rear wheel has cleared the sand and had enough time make one revolution after passing through the sand, then lean back into the curve on a slightly tighter line to continue the curve at the now slower speed. If necessary, resume braking by caressing your rims.

If you remain leaned in the sand, your tires will lose traction when they get on the sand, they will slide out, and you will crash. If you don't release your brakes before hitting the sand, your wheels will lock up when you get on the sand, you will lose traction, and crash. Understand? Good. If not, read it through again and think about it.

The main thing is to keep control and keep the wheels down. This requires remaining relaxed as much as possible and the only way you can do that is to practice your cornering drills.

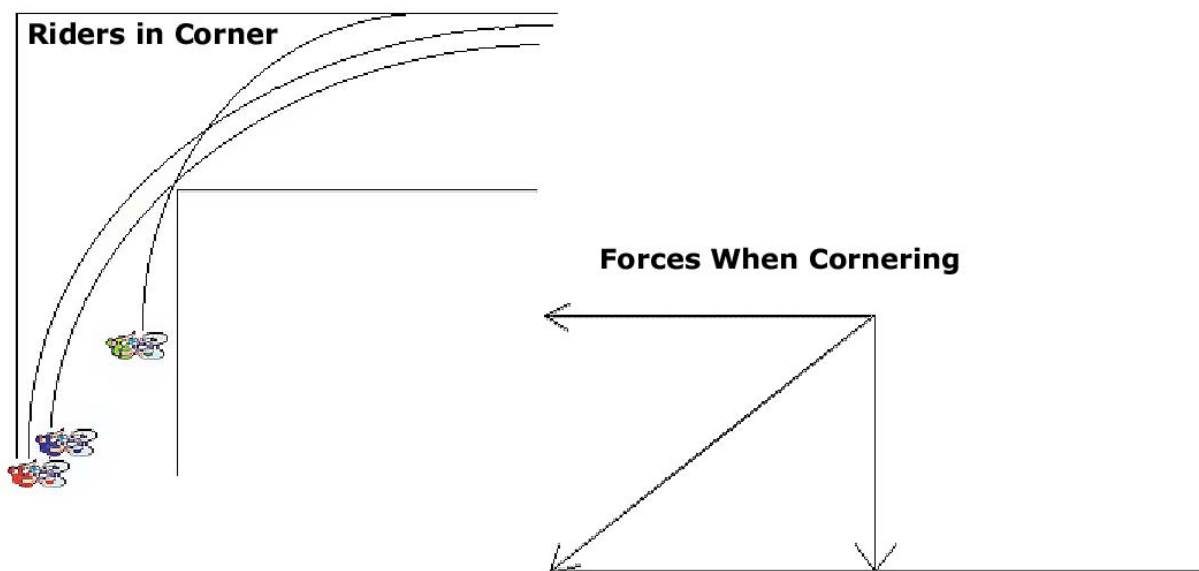
Inside – Outside

Over the years, I have often heard discussions between racers who were concerned more about crashing than winning. They would tell less experienced racers that you **ALWAYS** want to be on the inside when taking a corner because, if someone crashes on your inside, they will carry out into you causing you to crash.

If not crashing is your primary concern in a bike race, then they are partly right. What if you are cornering slowly enough that a rider doesn't carry outside when he crashes? This is especially true with 180-degree turns. When you crash when going too slow, you just drop and stick because you are going too slow to have enough centripetal force to carry you outside.

In slow corners, it is safest to be on the outside so you have an out in the event the rider in front of you crashes. If you are going really fast in a corner and the rider in front of you crashes, you tuck inside of him just a little because he will carry out from in front of you.

But, in a slow corner, the rider will just drop where he is, therefore, you must set the bike up and go to his outside because you will have riders or a curb to your inside. I always taught my riders in the lower categories to take really sharp and slow corners on the outside so they could set up and get around crashes. I got thanked more than once after a race.



Proper Racing Line

I have reproduced my wonderful little graphic at this point so you don't have to scroll back up to refer to it. We are now going to refer to the upper left graphic. We are going to talk about the red, blue, and green riders so review the picture again paying close attention to their lines through the curve.

Basic physics teaches you that the proper line through the corner above should be from the outside to the inside back out to the outside like the blue and red riders are doing. The reason for this is because it "flattens out" your line through the curve. The flatter your line through the curve, the faster you can take the curve.

Look at the line for the green (right) rider in comparison to the line of the other two riders. He is setting up on the inside and going straight to the outside. His line is much sharper which means he won't be able to take the corner as fast as the two other riders.

This is true for almost all corners even for down hill curves. You should always go from outside to inside to outside in order to flatten out and open up the curve.

The exception to this is the complex corner where you have to set up for one curve to come out of the first curve in proper position for a second curve immediately following the first curve. This takes practice because you have to be able to see the line for the second curve, the required entry point for the second curve, and then trace that back to where you have to exit the first curve. This permits you to establish where you should enter the first curve. It helps if you practice riding figure 8's.

Crossing Lines

Look at the green and blue riders in our picture. They are crossing lines in the curve. If they go into the curve at the same time, either one will have to break hard and let the other go or they will both crash. Riders should never take different lines into a corner.

So you ask, "How do riders go through a corner two or more at one time?" Look at the red and blue riders. They are not crossing lines but are taking **PARALLEL** lines through the corner. This means that the outside rider has

to either travel a little faster than the inside rider or he will lose ground. As you can see, there is a huge difference between crossing lines and taking parallel lines in a corner. The parallel line is how the pros will even attack to the inside of another rider in a corner.

This brings about a very important matter I have seen with increasing occurrence in US bike racing. Riders who don't understand this basic principle of physics try to keep passing on the inside just before a curve after the outside riders have already leaned or committed to the corner.

Because the inside riders are still going straight when the outside riders have committed, they are taking crossing lines and the inside riders are almost always "cut off" in the corner and forced to hit their brakes. They, in their ignorance, blame the outside riders but the truth is that the inside riders were in the wrong.

The rule is this. You should always be merged with and running a parallel line with the other riders in a pack at least 10 meters before the outside riders commit to the corner. If you are not, you will cross lines in the corner and either get cut off forcing you to brake hard and lose ground or you will crash. You cannot violate this rule because it is basic physics and you cannot change the laws of physics just because you want to move up one more position before the corner.

Therefore, it should be common sense that, if the pack is not going all the way out for either the entry or exit or all of the way in at the center and they are not braking for the corner, then the corner is wide enough for them to take the corner at full speed without using the full width of the course.

This means that, as long as you ride a parallel line, you can pass the pack on the side where they are not going all of the way to the curb. Understanding these basic principles makes it possible for you to develop tactics based on the way the peleton takes a given corner as long as you obey the rules.

If you find that a pack tends to over brake for a corner and is not going all the way out to the curb on the exit, you can save energy by drifting outside one bike width going into the corner, not braking and letting your speed carry by passing people on the left, and not having to accelerate every time out of the corner.

This is a risky move and you must use your own discretion as to whether or not to make this move because a rider could drift out at the exit and put you into the curb. To help prevent this, it is best to estimate your passing so you will be along side of the rider you exit the curve with so he will know you are there before he exits the curve and will leave room for you.

Of course, the opposite is true. Let's say the pack is going into the corner at full speed and not having to go all the way to the inside curve. If you take a parallel line through the curve, you can attack under the other riders into and through the curve to get a jump on them before they exit. This is commonly used by pros for attacking and going into the final sprint.

Cover the Rider on Your Inside

I clearly remember Eddy Van Guyse (the race announcer) teaching me how to corner in a pack of 100+ riders when you are going through a curve side-by-side.

We were in the Second Annual Summer Fest Criterium in the summer of 1970 (later it became Super Week.) It was early in the race and we were taking 90-degree corners at full speed four riders wide. He told me a very important rule that has stuck with me over the years.

Eddy said, "Always cover down on the rider to your inside." By this, he was telling me to always leave room for the rider on my inside to navigate the

corner because, if I don't and he crashes, he will carry outside into me and we will both crash. It is a pretty good rule. Don't forget it.

The way this works is quite simple. You are both carrying kinetic energy into a corner and using friction force to push you through the corner on just the right line. This means that the two forces have to be balanced just right or your line will change, possibly cause you to suddenly lose control, and crash.

When any two objects, which are in motion, collide, they exchange energy causing them to change directions. If you don't leave room for the rider on your inside in a corner, you will cross corners, collide, exchange energy, change lines very radically, and possibly crash.

Rider Size & Cornering

I have heard a myth about rider size and cornering which needs to be put away. We **KNOW** that smaller riders corner faster than larger riders. The myth has it that this is because the larger rider has a higher center of gravity and is, therefore, less stable in the corner.

This is true for a four-wheeled vehicle because it cannot lean to keep its centerline in line with the vehicle's center of gravity. But it is not true with a two-wheeled vehicle because the vehicle can lean.

You see, as long as the center of gravity is in line with the line of the vehicle and its racing down, the vehicle is stable regardless of how high the center of gravity is. Therefore, the center of gravity cannot be the reason that smaller riders corner faster.

The reason smaller riders corner faster is because smaller riders ride smaller bikes, which have a shorter wheelbase from front to back. On a racing car, there are two things to wheelbase, which affect the cornering speed of the vehicle. These are the front-to-back wheelbase (FB) and the side-to-side

wheelbase (SS) of the vehicle. We are not concerned with the SS wheelbase because we only have two wheels and lean in the corner.

What you need to know is that the shorter the FB wheelbase is, the faster you can corner. This is because a shorter FB wheelbase permits the vehicle to take a sharper line through a corner at a given speed or a faster speed for a given line through the corner.

A really great example here is a large truck turning in relation to a small car with the same SS wheelbase. The large truck has the longer FB wheelbase and has to take a longer line through the corner and/or a slower speed through the corner. This is true with a bicycle.

This is very important if you are a Criterium specialist and want a custom designed bicycle to help you be faster in corners.

What you want is a bike with steeper seat tube and head tube angles. The steeper seat tube angle moves the seat tube farther forward making more room to move the rear wheel forward. The steeper head tube angle moves the front wheel backwards.

These two things in combination decrease the FB wheelbase and make the bike faster in the corners. As a matter of fact, you will notice that track bikes have sharper tube angles and a shorter FB wheelbase, which makes them faster and easier to handle in the turns.



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Part IV • Chapter Eleven

Down Hill

Down Hill

The first and most important thing to remember in downhill racing is to never ride faster than you feel comfortable or closer to someone than you feel comfortable.

This discomfort or fear is your subconscious mind telling you that you don't have the experience and have not developed the motor skills to operate under the existing conditions. Listen to this "gut" feeling. It may save you some skin. It is better to lose a bike race than get hurt. Use common sense because traveling at speeds over 25 mph much less over 50 mph is a serious thing. Falling off a bike at 25 mph is like falling out the back of a pickup truck at 25 mph with a bike between your legs. Safety first.

Here more than anywhere, the word relax is very important. Over reacting or causing the bike to pull to the outside of a corner at high speeds can cause you to crash. Therefore, I stress relax, relax, and relax on downhills.

DON'T go any faster than you feel comfortable and can relax at. To be safe, down hilling must be a smooth, fluid process like dancing with the mountain. If done in this manner, down hilling is fantastic.

It takes practice and effort to learn how to relax on downhills. You simply have to ride enough of them to gain the experience required to obtain the confidence for good downhill racing. You can start by learning to relax on fast straight stretches while learning to enjoy the feeling of the speed.

Then learn to relax in gentle turns by learning to enjoy the feeling of gently changing directions at speed. Learn to relax while **LETTING** the bike do the turning caused by you leaning into the turns in a relaxed manner. Also very helpful is to practice your cornering skills as I explained in the chapter about cornering. This will help you relax in the corners on downhills.

Proper Tuck vs. Pedaling

Over the last 35 years, I have seen a number of different positions and read some unreal articles in magazines about proper downhill position on a bike.

First, you must understand that the bicycle is designed and built to have your body weight properly distributed on the bike. Shifting your weight too far forward or back destabilizes the bike decreasing your control, safety, and potential speed.

For safety, you need to keep your weight properly distributed on the bike by not leaning forward over the handle bars which places most of your weight on the front wheel and can cause the rear wheel to break loose in corners or too far back by hanging behind the saddle which puts most of your weight over the rear wheel and can cause your front wheel to break loose in corners.

Plus both situations don't permit proper control if something should suddenly happen requiring immediate control of the bike.

Some riders make the excuse of using these positions for straight stretches and moving to the normal position just before the curves. The problem with this is that changing positions during the downhill increases your wind resistance much more than the proper position slowing your entire down hill.

It is important to understand that, on most down hills, the steepest part is at the very top and beginning of the downhill. Any speed lost after this point

can't be regained and decreases your maximum potential speed for the rest of the downhill. Therefore, it is best to get your speed up to your maximum potential as quickly as possible, obtain the proper position, and stay as close to that position as possible for the rest of the down hill.

Second, you need to understand aerodynamics. The fastest position on the bike will be the position, which provides the smallest frontal picture or least frontal resistance to the wind.

Think of looking at yourself from in front of the bicycle while down hilling. The least area space you can see, the less wind resistance you will have and the greater the speed. In other words, everything from your shoulders to your hips should be "drafting" you head and shoulders so that you would not be able to see anything but your head and shoulders from directly in front of the bicycle. If you butt is sticking up above your head, it will increase your wind resistance and slow your speed.

Therefore, the best position for maximum down hill speed is with your body from your shoulders to your butt horizontal and in a straight line so that you look like a human arrow cutting through the wind. In this position, you will find that your body acts like a wing with the wind flowing over it and you will actually develop some lift.

At about 50 mph, you will actually feel the bike lift a little of your weight off of your tires. At first, this can be unnerving and has both good and bad points. The good point is that you will have less rolling resistance and will accelerate. The bad point is that it will take less to cause you to crash because you are almost airborne. Therefore, when this happens, you need to pay very close attention to the road in front of you for anything, which could affect your control of the bike.

The proper position for your feet is with both feet the same distance from the ground so that both crank arms are horizontal to the ground. Your legs

need to be in closer to the bike so that they will catch less wind because they will be "side drafting" the head tube, front wheel, forks, and handle bars of the bike.

The hands are tricky and the proper position for your hands depends on your experience, how comfortable you feel, and the conditions of your downhill. Remember that you have better leverage and control with your hands at the outside of the bars or farthest from the stem. On the other hand, the closer your hands and elbows are to your centerline, the less wind you will catch and the faster you will go.

A less experienced rider or a rider in a risky situation should keep his hands in the drops of the bars for maximum control. A more experienced rider under better conditions would put his hands on the tops of the bars some where between the curves and the stem. Please use common sense and good judgment here. Even the best downhill riders with a lot of experience will use different positions on the bars for different situations. Listen to your gut.

So, when do you pedal and when do you tuck? You will find that you will reach a speed where, if you tuck, you will accelerate and go faster. Below this speed, you will go faster if you pedal. I have found this speed to be at about 35 miles per hour depending on such things as wind. You have to play with it and learn to feel the bike in order to learn when to sit up and pedal and when to tuck and coast.

Speed Ripples, Rail Road Tracks, and Cattle Guards

I have found that most racers who only race in cities don't learn how to properly navigate the above obstacles and tend to over react and slow down.

As a racer, I love this because it always creates a perfect opportunity to attack. This is what I always taught my racers. If you are riding with

inexperienced open road racers and you know one of the above items is coming up, make your way to the front and attack when the others shut down.

So, how do you handle these obstacles? First, you have to understand the potential hazards for each obstacle.

Speed Ripples or Road Rapids

For those who don't know what speed ripples or road rapids are, they are the washboard type bumps created on the road when car tires encounter the asphalt that has been heated by the sun to where it is soft. They are commonly found in curves on fast down hills. Hit at too high of a speed, they can cause you to crash.

Understanding the cause should tell you how to normally avoid this potential hazard. If the car tires create them, then they will normally be found only where the cars tend to track with their wheels through the curves. Therefore, it should be common sense that, if you feel they are likely to be present on a curve or down hill, then simply ride between where the car tires normally track to avoid them and keep your speed high.

But let's say you suddenly find yourself flying into a row of these road bumps and don't have time or room to move between them. The safest thing is to relax and not panic. Then quickly move your feet to a parallel position with the ground, shift your weight from your saddle to your pedals with your knees bent like shock absorbers, and let the bike rock under you.

As long as you keep the bike under control as far as being in line with your center of gravity and the "racing down", you should be all right. I have used this technique to hammer through some hairy road rapids in curves on fast down hills without losing much speed.

When I was young and crazy, I actually attacked into these road rapids on fast down hill curves because I knew the other riders would slam on their brakes fearing I might crash into them.

I have opened as much as about one minute within as little as a quarter of a mile with this stunt and purely by the grace of God survived. I used to take the ideas of seizing any and every opportunity to gain an advantage over my competition to an extreme. Experience has taught me to be a little more rational. :-).

I now only use this technique to survive a bad situation. It is pretty much the same technique that MTB riders who are really good at down hills use.

Rail Road Tracks & Cattle Guards

Any time you come on an obstacle like railroad tracks or cattle guards, it is a good idea to move just to the side of the rider ahead of you so you can get just a little better view of the obstacle. You need to make sure you are not going to hit a crack between the rails, a pothole on either side of them, and can time your approach better. If you are going fast enough, you can bunny hop these obstacles.

If experienced road racers see the pack starting to slow for these obstacles, they will attack just before them to get away. I normally hammer these items to keep from being attacked or to attack those who slow down.

You can do this either by bunny hopping or, if going too slow, shifting to a slightly higher gear and slower cadence, putting your weight into your pedals with your knees bent slightly and loose, and letting the bike rock under you as you attack over the objects.

This latter technique is commonly used by MTB riders to attack rough sections of road or roadies to race on such surfaces as cobblestone and dirt roads.

It takes practice and discipline to handle these items with skill and reasonable safety. Therefore, I take them just as aggressively when training as when racing to improve my riding skills.

A disadvantage to this is that I tend to go through rear axles frequently.



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Part IV • Chapter Twelve

Crashes

Crashes

I realize that it is not always pleasant to discuss or think about crashing but it is necessary to discuss crashing from several perspectives to decrease your potential to being injured from crashing.

We need to consider how you can decrease your potential for crashing and how to decrease your potential for being injured from crashing since it is inevitable that every one who races will crash.

Avoiding Crashes

Most crashes are preventable and are caused by bad riding habits and carelessness. The most important skill in bicycle racing is to be able to ride straight lines and be predictable in movements.

Sudden radical lateral movements are not acceptable except in emergency situations. It is also very important to be able to flow with a smooth steady pace on the front of the peleton or on someone's wheel. Constantly varying your pace greatly increases your chances of crashing or causing crashes. You need to learn to control your speed with you legs and caressing your brakes just lightly while still pedaling. Also learn to use your eyes right as I explained in a previous chapter.

The most common cause of crashing is to over lap the front wheel with another rider's rear wheel. I have been around racing long enough to know

that it is not possible to ride in nice neat rows. We are going to overlap positions but we must not overlap wheels.

What is the difference?

A good rule of thumb for what is and is not overlapping a wheel is the distance you are to the side of the wheel or rider in front of you. This, in part, has to do with what is erratic riding.

A rider needs to be able to move a little laterally in a peleton to avoid touching a wheel or hitting something in the road. Generally, it is permissible to move up to about one foot (.33 meters) laterally without being considered erratic. If a rider moves 1 foot (.33 meters) or more, then he is considered to be riding erratic.

Therefore, you should not overlap a wheel with less than 1-foot (.33 meters) distance between your wheel and the wheel to your side.

This means that, if you are overlapped closer than 1-foot to the wheel to your side and the rider hits your front wheel with his rear wheel, then you "put yourself down" or caused the accident.

If you are overlapped with the rider 1-foot or more to the side and that rider hits your front wheel, then he put you down and caused the accident. This is because a rider should always be aware of the riders around him and not make sudden lateral movements in excess of about one foot except in an emergency. That rule of thumb leaves a safety margin of about half a foot (.6 meters.)

When passing a rider or moving up on his side in very close quarters, it is common practice to let that person know you are there by touching them on

the hip with the back of your hand. In the lower categories in a potentially dangerous situation, it is a good idea to say something like "on your left" or "on your right" to let them know where you are.

The pros have learned that it is a good practice to assume that, if there is a rider to your side in front of you, then there is very likely a rider to your side behind you. This will help prevent crashes.

Another common cause of accidents is when a rider feels he may be about to crash and "gives up the bike" to bail out when he could have possibly prevented the crash by saving it. This is most common with beginning cyclists or racers.

The most important thing in a crash or near crash situation is to remain relaxed and think. You want to look for an out from the crash. This may include such things as riding around the crash, holding someone else up, or even riding over another rider by bunny hopping the front wheel over them and pedaling the rear wheel over them.

Using this technique, I have ridden through dozens of crashes with riders going down all around me. Learn to recognize the flow or direction the crash is moving and move accordingly. For example, don't try to ride around a crash in a corner where the crash is moving to the outside by riding toward the outside. If someone crashes in front of you in a corner and they are moving fast enough that they will carry to the outside, then hold your line and try to pass inside them.

The same principle applies on a Velodrome. If you are on a steep banking and someone crashes in front of you, don't try to get by under them because gravity will pull them down into you. You always try to go over the top of the crash. On the other hand, if they are crashing in a corner and are going too

slow to carry outside, you must determine very quickly where the most room is to pass and go there.

If you hesitate going into a hole, you may find yourself sharing that hole with one or more other riders. I have actually had to crash riders because the rider in front of me hesitated going into a hole that was closing and would have cause himself, myself, and the riders behind us to crash. In one case, the hole was big enough and closing slow enough that six of us could have made it through but the rider in front of me hesitated and put us all at risk.

As I hit him in his left hip with my right shoulder to crash him onto the sidewalk and clear the hole for us to get through, two of the riders behind me tried to go to his right where he would have crashed them onto the sidewalk even if he had gotten through and they ended up going down with him. I got myself and the two riders who stayed behind me through before the hole closed, saving three of us.

The big key here is to try to keep the bike upright as long as possible to either get you through the crash or to slow you down as much as possible before you crash. Control the crash as much as possible.

I used this technique in a crash on a training ride where a woman dumped it in front of me and I had no where to go. I hit my brakes hard to slow as quickly as possible. At the last instant, I used my handlebars as a gymnastics vaulting horse, kicked my hips out to the right side so I could roll when I hit the ground instead of slamming into it or sliding on it, hit the ground, rolled three times, and got up with only minor scratches. By vaulting off of my bike at the last instant, I also took my weight off the bike keeping the forks from collapsing on impact. No significant damage was done to the bike or me.

You have to learn when to ditch the bike and when to save it. Generally, if you are going to impact something hard like a body on the ground, ditch. If you are going to hit the ground, you can either ditch and roll at slower speeds or ride the bike down so it takes most of the impact at faster speeds.

I was clocked at about 40 mph on the start of a down hill once when my bike picked up speed wobble so bad that the frame began to whip side-to-side. I knew there was no out so I kept calm and tried braking but it only made the frame whip worse. I then knew I had to lay it down before my speed got any higher because I knew I was going to crash anyway.

I had a choice between crashing on a very rough asphalt road or a grassy shoulder with a drop and trees next to it. I chose to crash my bike on the grass but had to crash the bike so that I wouldn't go over the edge of the hill and into the trees. I managed to hit in such a manner that the handlebars and my thigh absorbed most of the energy. The only damage to the bike was collapsed bars and I had a large contusion on my left thigh from a crash that could have been very serious.

I have found that one of the most dangerous places to crash is on wide straight sections of road. This is because riders tend to feel very safe, get careless, and cause a crash in the middle of a peleton.

Since the peleton is going in a straight line, the crashing riders don't move from in front of the riders behind them. They just dump in front of everyone. This leaves the riders behind them trapped. If these riders are not using their eyes right by looking ahead in the peleton instead of looking just at the wheel in front of them, they won't see the crash until just before they are part of it. Therefore, they won't brake in time to miss the crash.

This causes large crashes with riders going over their handlebars (the worst type of crash) and landing on each other. These crashes often cause the most injuries.

It is too frequently believed that open racecourses are safest when courses with a lot of corners are actually safest. This is because riders focus on what is going on around them more when cornering and don't get careless. Plus a crash in the corner usually causes the riders to carry from in front of the following riders leaving the following riders an out by just holding their line. Plus crashing in a corner usually causes a loss of skin while going over the handlebars can easily break bones and cause other serious injuries.

A great example of this was a new racecourse they tried in Southern California in the 1980's because certain race officials felt that more open courses were safer.

It was a one-mile course, which was almost all a big gentle, flat circle with only one 90-degree corner and was on a very wide course. Every one was ranting before the race about how safe the races were going to be and I warned my riders that this would be a blood bath.

As it turned out, the local community didn't have enough ambulances to keep up with all the injuries. They actually had to delay the start of races until the ambulances could clear all of the injured from previous races off the course.

The largest crash I have ever seen occurred on that course about 30 to 40 meters before the pack got to me. The second rider was over lapped on the first rider when the first rider swung out. Most of the riders in the pack were not using their eyes right and the crash quickly spread curb to curb with at least 70% of the riders in a pack of 140 riders going down.

I found out after the racing that almost all of the riders in the category 3 and 4 races crashed two or three times during their races. It was the worst race I have ever seen in my life.

In the chapter Bike Handling, I will cover a variety of training drills and sports for cross training which will help you decrease your chances of crashing and being injured in the event you do crash.



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Part IV • Chapter Thirteen

Bike Handling

Bike Handling

In this chapter, I want to discuss how to improve your bike handling for racing or recreational cycling. Bike handling should be looked on as a skill or tool you develop with practice and effort. It is not something you are born with and you have to maintain it for as long as you ride. You can't just develop it and forget about it.

Here, the old saying is true that, if you don't use it, you lose it. A good rider will constantly work on his bike handling development and maintenance. Note that I am not talking about trick riding but about riding technique, habits, and discipline.

Cross Training

The off season is the best time to work on things which you may not have much time to improve during your on season. Your off season should be the single most productive time of the year in developing all aspects of racing fitness development and this includes motor skills development.

I strongly encourage anyone who can afford it and has even a little time to spare during the off-season to do cross training for motor skills development.

Some of the things you want to work on which will help your bike handling and increase your effectiveness and safety is agility, body control, spatial awareness, and muscle movement coordination. Therefore, I will discuss

some of the activities, which will help improve such desired traits and explain those activities' benefits.

Body Control

Gymnastics is pretty well known for benefiting cyclists for off-season preparedness. It teaches tumbling to help control crashing but, more importantly, gives you spatial awareness so that you instinctively know where you are in space when flying through the air.

I encourage you to think of riding a bike as flying through the air on top of a bicycle. This is because, if the bike suddenly disappears out from under you, you are literally flying through the air. Therefore, instinctively knowing where you are in relation to the ground and making the right movements will help you make the best possible landing.

But gymnastics helps before you leave the bike. I took two classes in gymnastics from one of the best collegiate coaches in the US, Coach Rusty Mitchell at the University of New Mexico. He was ranked third in the US in collegiate gymnastics at the time and has produced a number of Olympians.

I know for a fact that the instinctive body control and increased agility on the bike has saved my hide more than once. It has increased my ability to make the moves necessary to ride through crashes more than once. And always remember that riding through crashes is better than doing damage control while crashing.

But there are a number of other activities, which will also help develop good body control and spatial awareness.

Some of the ones I have found helped my riding, bike handling, and safety in a peleton are competitive diving, collegiate wrestling, martial arts or combatives, and dance. Basically, any activities you enjoy which teach you

to improve your body movement with a gymnastics type of controls will help you ride better and instinctively make those hide saving moves.

I have found that such activities actually improve my enjoyment of the sport because they have given me a more fluid movement, which feels much better. When I ride a bike, I dance on the pedals. To me, my bike is my dance partner and we make really great music together.

These other activities have made it seem as if my bike and I flow together in movement. I recently received a complement from one of my former racers who regularly trains with a number of professional racers. He said that I am one of the two smoothest riders he has ever ridden with and he has been riding bikes for several decades. Getting the kinds of complements I have about my bike riding makes the sport that much more enjoyable. But you have to work at it and earn it.

Practice Drills

There are a number of other things you can and should do throughout the year when riding your bike, which can improve your riding. I work on these things on a regular basis even when not racing.

I have found that the motor skills they develop and maintain make my cycling much more enjoyable and safer. They provide me with the motor skills needed to help me out of some of the troubles you can find yourself in with just daily riding. Anyone who does any regular pack riding should do these drills as often as possible.

I regularly use my easy training days to work on motor skills. When I was racing, I would occasionally find an empty parking lot and practice these drills under a full moon. You need to make these drills play so you will want to do them more often. You should always use good judgment when doing these drills and only take them as far as you feel safe and comfortable.

Riding in a Straight Line

First, riding a straight line is the single most important skill you can develop. This is very important when riding in the close quarters of a peleton.

To do this, I regularly climb on top of those 4 inch wide white lines along side of the road and ride on top of them for miles. You do this by looking as far up the road as possible while using your lower peripheral vision to check your position on the line.

This simple little drill also helps you learn to use your eyes right and be safer in a peleton. If you look down at the line more than for an occasional check, you tend to wobble off of it. This technique also helps smooth out your pedaling because you tend to find a rhythm.

Relax

Then you need to teach your muscles to properly respond to changes in direction while remaining relaxed. These are very good for improving your cornering and emergency riding for getting through crashes.

There are a variety of drills or games you can use here. One that I regularly enjoy is to find a nice empty road and do a little lazy swerving. It is like down hill skiing on your bike. You relax, lazily lean towards the opposite side of the lane, and let the bike take you there while enjoying the feeling of turning.

As soon as you reach the opposite side of the lane, you lean back the other way and let the bike take you there. I don't recommend this in traffic. :-)

Fun Drills

Another good thing to do is to find a good empty parking lot on your easy days, use a small gear like a 42x17 or 39x16, and do some fun drills.

You can do these alone or with one or more teammates. They should be fun and you should be seeing how good you can get at these drills. You want to keep pedaling while doing these drills to help you keep relaxed and learn to ride through corners and crashes.

Decreasing Radius Circles

The first of these drills are the decreasing radius circles. You want to lazily lean into a small circle while pedaling at an easy pace, let the bike arch and carry you through the circle, and slowly decrease the turning radius so that the circles keep getting smaller.

You back out when you feel yourself tense up or the rear wheel start to slip a little. You must be careful not to get dizzy. You need to circle in one direction for a little, ride straight for a while to let your body recover from the turning forces, and then ride in the opposite direction for a little. You must ride in both directions to improve your handling in both directions.

These circles help your body and muscles get used to the forces of cornering. They really help you learn to relax while cornering and also help you get a feel for how fast you can go in a certain radius before your rear wheel will skip telling you that you can't go faster for that radius without sliding out.

Figure Eights

Then I will practice riding figure 8's. This is to not only help me relax and get used to cornering but also to directional changes. This is very important for making those sudden emergency moves which happen in

racing. Here again, remain relaxed and keep decreasing your turning radius slowly until you either tense up or feel the rear wheel slip. Be careful with all of these drills to not get dizzy.

Swerving Drills

I will do a number of swerving drills in a parking lot to improve my ability to suddenly change directions and to hit a spot while cornering. I will swerve between broken lines or ride in and out of the parking lanes so that I am swerving in tight loops.

Riding Without Hands

It is also important to practice riding without your hands. Most people tend to believe that the bicycle is controlled with your hands when cornering or making sudden moves. This is not true.

The hands only provide two real services when riding at speed. They help you drive into the pedals by pulling on the bars and hold the front wheel straight in corners while torqueing the bike to keep the front wheel from sliding out. The real control of the bike is done with the saddle and controlled by you shifting your center of gravity. It is very much like skiing.

You should practice riding with your hands off the bars to increase your control of the bike in several ways. Always do these drills when there is no other traffic of any kind including bikes.

The first technique is simply to practice riding on a straight line without your hands on the bars. When you become confident with this drill and feel well at home riding without your hands on the bars, lean slightly to let the bike arch a little.

Caution has to be used here because a pro bike turns so quickly.

This drill gives you a much better feel for the bike and improves your control with your body. I will do these drills until I can do big looping circles and gentle swerving without hands while remaining relaxed.

More Parking Lot Skills

In a parking lot, you should also practice such skills as balancing and the "bunny hop" because you will need that control in a pack.

I used to practice picking up objects. I started with large objects such as soda cans and worked my way down to where I could pick up two small coins (US dimes) placed about 10 to 15 feet apart. I developed a ball game from this that I played with one of my racing friends, Eric Vargas.

We found a tennis ball in an empty parking lot. One of us would roll the ball across the parking lot and the other would have to chase it and pick it up on the roll. He got one try and then had to move to permit the thrower to pick it up. You got a point each time you got the ball before it stopped rolling. Whoever picked it up, got to throw it the next time.

We had a great time playing the game. I guess you could call it bike ball. You really need to be good to play it and must be very careful.



CHIN SURFING

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Part IV • Chapter Fourteen

Looking Over Your Shoulder

Looking Over Your Shoulder

Being able to look to see what is going on behind you is a very valuable skill and tool in bicycle racing. It is also grossly ignored to the detriment and danger of everyone. It is often very important at many times in a race to need to see what is developing behind you without posing a threat to yourself or others.

The technique commonly taught is to place a hand on a rider next to you while looking back. This is to make sure that you don't move from your line while looking back and run into another cyclist causing a crash. The trouble is that the rider next to you is rarely a friend or teammate that will want to sit through a sudden attack while you hold on for a quick look back.

In the 1969 US National Road Championships, I was sitting next to a rider who sat up and looked back. When he did, he shifter his weight so that he drifted to his right, hit a sudden drop off at the edge of the road, his wheels kicked out from under him to his right, and he fell toward me. I barely reflexed just enough and just in time so that his head just barely brushed my right foot as he hit the ground and took out a bunch of riders behind him. I learned later that he had spent the next three months in the hospital.

Because of this and other incidences, I used my kinesiology and training in coaching techniques to develop a very effective series of skills drills, which will teach your body to properly reflex to the right muscle movements so you

can look back in a variety of methods without drifting more than a few inches.

For the safety of everyone in the peleton including you and me, I will present those techniques and drills on this page.

Note: Before attempting to look behind you, ALWAYS get a mental picture of the road ahead of you and make sure there is nothing you can hit. I call this clearing the road ahead of you before looking back.

Both Hands On Bars (or) Quick Look Technique

This technique is commonly used for a quick glance to gather very basic information such as is anyone on your wheel or to your side. You are not usually looking for detailed information as to who is there or is there any food in their teeth. It is most commonly used to see if there is a gap behind you, if it is clear to move to your side, or if anyone is making a move. It is usually necessary during jams, sprints, or just after attacking or bridging.

This technique is done with both hands on the bars in any variety of positions and will only involve turning your head without causing the bike to move off line.

The drill is to ride on a line on the side of a road (without traffic) or in an empty parking lot. Quickly look back by just moving your head and looking just long enough to see any object behind you just long enough to know it is there and then quickly looking back to see if and by how much you have deviated from the line you were riding on.

You need to practice this drill regularly with the goal of developing the skill to where you can look back long enough to get an image of an object

without deviating from the line you are riding on by more than a few inches if at all. You must practice to both sides, in a variety of hand positions, and will have to continue practicing these drills as long as you race or you **WILL** lose the skills.

I used to also practice this skill while cornering and jamming through the banking on a Velodrome. This made it possible for me to see as far as possible behind me while taking a corner or covering moves around me during the sprint on a track. Professional racer, Sean Wallace of Ireland, was the best I have ever seen at this move on a track.

The One Hand Look

This technique is used when you need to gain more information so you need to get a better and take a longer look. It is done while keeping one hand on the handle bars and involves rotating the shoulders in such a manner as to not shift your center of gravity to the side of the bicycle.

This move is commonly made when you need to know such things as exactly how big the gap is behind you, who is behind you, or what actions are taking place on the front of the chasing peleton when you are bridging or in a break. This move is done when the intensity and moment of the race are such that you can afford to look back a little longer.

Again, position your bike on a line along side of a road or in an empty parking lot, release the handle bars with one hand, rotate your shoulders in such a manner that you can look back more clearly, and then quickly look back at the line to see if and by how much you came off the line.

Make sure there is enough asphalt to the side of the line that, in the event you do drift to the side, you won't ride off the road and crash.

You will find that you will have to practice with how you rotate your shoulders to keep from coming off the line. Again, you need to practice this move to both sides and have a goal of getting to where you will not deviate from the line you are riding on.

This technique will require more work than the quick look and must be done until it becomes an instinctive habit. You can't get sloppy with this move because you are moving so much of your body that even a little mistake will cause the bike to move to the side a lot.

The No Hands Look

I do not recommend this move for everyone and it should only be attempted under the safest conditions after you have very effectively mastered riding without your hands. You must use common sense in attempting this move.

The reason I developed this move was because it forced me to become so much better at moving my body on the bike without shifting my center of gravity that it made me much better at doing the other moves. It was designed to refine my control of the bike to the highest possible extreme for the best possible safety.

The technique is to set up without your hands on the bars while riding on a line under the safest possible conditions. Then rotate your shoulders so that you can see behind you and quickly look back to see if and by how much you deviated from the line you were riding on.

The goals here are to see how well you can stay on the line and how long you can look back without coming off the line

It teaches extreme body control and will almost never be used in a race. It is simply a training drill for maximum body control development. In case you

have yet to notice, I am an extreme perfectionist in the area of skills development. I used to always push myself to see just how good I could get at performing any given task requiring motor skills development.

The Standing Look

This technique is commonly used when standing and climbing, attacking, or having just broken away from other riders while attacking. This is the standing version of the quick look but can also be used for a longer look because you can shift your shoulders just enough for a better look when standing.

This drill can be practiced on climbs or on flat ground if you shift into a gear, which will slow your cadence, just enough to permit you to stand without spinning out.

Again, you get on a line, look back behind you while standing, and quickly look back to see if and by how much you came off the line. You have two goals with this technique.

These are to see how little you can make the bike move from the line and how long you can look back without causing the bike to move from the line. As with all the other moves, you need to practice this move looking to both sides and should also practice this move with your hands on the brake hoods and on the drops.

Please remember to always clear the road ahead of you before looking behind you.

This should become such a habit that you will not have to consciously think about it. All of these techniques need to become so much of an instinctive

reflex that you should not have to worry about drifting when making any of them.

Remember that you must always maintain a motor skill or you will lose it. You cannot just build a motor skill and expect to not have to maintain it. With motor skills, if you don't use it, you lose it.



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Part IV • Chapter Fifteen

Contact

Contact

It is very important that you learn to ride while making contact with other riders.

If you race long enough, you will regularly make physical contact with other riders in the peleton, whether intentional or unintentional, and must learn to (1) maintain control of the bike, (2) not let it phase you, and (3) be able to keep racing while maintaining control.

If you don't, other riders will learn about it and use contact or the threat of contact to intimidate you into backing off. Therefore, you must learn how to properly do contact riding and how to develop the confidence to ride in contact with other riders.

First, I must state that this is not ice hockey and the intentional crashing or injury of racers for the sake of winning is not and should not be acceptable in the sport. To make this acceptable would be to quickly turn our sport into a blood bath.

Because of this, I teach contact for defensive measures so you will be able to take care of yourself when accidentally making contact or running into the occasional idiot who has been improperly trained to believe in using cloak and dagger racing tactics.

There are many situations in which you will need to use contact just to race. You will have to touch riders on the hip with the back of your hand to let

them know you are there and will even have to push against their hip with your hand to literally keep them from closing down on you.

You will have to lean on a team mate for any number of reason, hold a rider up so he wont crash into you, or shoulder a rider out of the way who decided to go for the same hole at the same time so you don't crash. You may even have to crash a rider who has made a mistake so he doesn't crash you or someone else. We hope not but it does happen. In track racing and, especially Madison racing, contact happens all the time and is even a part of the sport within reason.

First, we must remember that the control of the bicycle is done with the main torso of the body. This is the base for which all contact must be developed from.

It is more solid and safer to control a rider by pushing the torso than anywhere else. You also want to do all leveraging off of your own torso. This means that all contact should involve pushing against or with the torso. This is the part of the body from your shoulders to your hips.

If you have to push a rider off of you, you push against some part of the torso or a part that will normally leverage off of the body. For example, you will push with your hand against a person's hips, chest, or shoulders or you will push with your upper arm against their upper arm by leveraging your upper arm against your torso and not your handlebars.

You **DO NOT** push against their lower arm because they would instinctively leverage off of their handlebars causing the bars to turn and possibly crash into you.

When using the upper arm for leverage, it is very important that you be sure to leverage your upper arm against your torso and not your handle bars

while keeping your hand ready to release the handle bars in case they over rider your push.

Any action, which will cause you to suddenly turn your bars, will cause you to crash, as the bike will tend to turn out from under you leaving you airborne. The trick is to keep the lower arm and hand relaxed while pushing with your shoulder muscles as if you are trying to lift your arm up to your side the way a bird flies.

When pushing someone else, always be ready to suddenly pull back in case they suddenly decide to give way to you. Don't over extend your weight when pushing except in an emergency.

Let's say you are just starting out or just not confident enough to make contact. How do we get you to where you can ride contact comfortably and not let it interfere with your racing?

What we do is take you through a series of steps during your regular training and you don't advance to the next step until you are comfortable at the step where you are working. This work needs to be done from two perspectives. These are you making the contact and the contact being made by someone else.

I have found that it is always best to start with someone else making the contact with the beginner because he can have both hands on the bars for confidence and will learn how to make contact properly by seeing others do it to him. In doing this, the teammate **MUST** always be aware of whether or not the rider feels comfortable with the contact and be ready to back off. Remember that, done properly, this will take weeks and even months to accomplish.

You simply start by riding along side of the new rider and placing a hand on their shoulder or lightly grabbing their jersey pocket while watching their

reactions. They need to know in advance that you will be doing these things and why they are being done. It is also a good idea for them to see the more experience riders making contact before they are expected to so they know it is normal and can be done without crashing.

When you see that the rider is comfortable with a light touch, then you do a little lean or push/pull to effect their torso just slightly. You really want to keep it where they are comfortable because, if they over react, they could crash into you.

After they become accustomed to a light lean or being pushed and pulled in a front to back direction such as slinging lightly, you can lightly push them from the side. What we are doing is training their reflexes to do the right thing in relation to an external force being applied against them. The most important reaction is to remain relaxed. If they tense up, they reacted wrong and you have to back off to permit them to relax before trying again.

After you have reached a point to where they are comfortable with these steps and you have been able to slowly increase the amount of push, you can just ride up along side of them, throw an arm around their shoulders, and lean on them.

Then you have them start practicing the same steps starting with them lightly touching you and other team mates and slowly advancing to pushing and pulling and then leaning on other riders. It is very important that **EVERY** rider learn to be comfortable with contact racing because any rider who is not can over react to contact in a race and this is dangerous to all of us.

Next, you begin working on shoulder pushing by riding close enough to lightly push against another rider with the upper arm. You start out doing these drills with a light push so the rider can figure out the mechanics before

their body weight is committed enough to potentially cause a crash in the event that they react wrong.

Also, it is important to understand that, when riding that close to each other, you need to extend your elbows to the side of the bike just enough to make sure that you won't tangle your handle bars with the other rider's handle bars.

During my drills, my more advanced riders would ride down the road leaning on each other with their bikes at an angle holding each other up while talking and laughing. This always helped put the beginners at ease because they could see that you can ride with extreme contact and not be crashed.

I have found that the best time to do these or any of the other drills I have mentioned on any of my other pages is on your short, easy days.

You get together with your team and coach, decide which drills you will do, give the less experienced riders about 5 minutes of instruction while standing still so there won't be any riding distractions, and work on a drill for about 10 to 15 minutes, followed by feedback for the riders before doing the next drill.

My clinics started with half an hour of pace line, echelon, and pedaling work on flat ground in a small gear (about 42x17 or 39x16) followed by a variety of different cornering, handling, or contact drills. I even had them bunch up into a pack to help them get comfortable with pack riding. I never let these clinics go over 60 minutes because their attention span and motor skills development begin to drop off after about 50 minutes and they will start to develop bad habits. Plus it keeps your easy rides short.

My program was very strict and progressive. Before you could join the Los Angeles Racing Team, you had to take a 3 to 4 hour lecture clinic on all of the material listed in my Riding Discipline section. Then everyone was

required to regularly attend the weekend skills clinics where we worked on all of this stuff weekly unless there was a race on Saturday. We did about 45 of these clinics a year.

Our Sunday training rides were closed so that **NO ONE** was permitted to ride on them unless they were a team member who had taken the lecture clinic and had proved themselves in our skills clinics. They had to have my approval and the approval of at least one other experienced racer. This usually took at least 2 to 3 months to achieve.

The end result to this was that my riders were crashing less in races than riders in other programs. Our Sunday training rides had 5 crashes in five years when the other programs would have as many as half a dozen crashes in one ride.

In the last year I was coaching the program, I had the riders vote on whether this policy should be changed and 100% of the riders voted to maintain it because they really loved not crashing as much as riders on other teams. It works.



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Part V • Chapter One

Mechanical Experience

Mechanical Experience

I have received a number of emails from readers who need help with the machine part of bike racing in various aspects. Most have been relatively new to the sport but some have been more experienced.

I have realized that, since the racing unit is both a man and a machine, then I must provide you with at least the basics for the machine part of the racing unit. I will go beyond that to provide you with at least some of the trade secrets which I feel you need to know and will help improve cycling for every one.

First, it is important for you to know where I have gained my knowledge about the bicycle over the last 35 years of racing and coaching.

This experience has come from three basic aspects of my cycling career. The first is my individual experience and learning from other racers. The second area of experience comes from working as a bicycle mechanic at several different points in my life. The third area of experience comes from working with race support mechanics and doing that part of the job myself. I feel that God has blessed me over the years by making it possible for me to learn from some of the very best mechanics.

Personal Experience

Before I first started racing bicycles, I was working my way through college in Albuquerque, New Mexico on work-study and didn't even have a car. My only means of transportation was walking and I had always wanted a 10-

speed bicycle. I saved up my money (\$89), walked to a bike shop just off of campus called Hansan's Cycles, and bought my first 10 speed, a 1968 metallic green Schwinn Varsity.

I later found out that the owner, Bud Hansan, had been a pro Six Day racer in the 1930's and he showed me a fair amount about caring for my first 10 speed. He later put me in touch with the president of the only racing club in Albuquerque at that time, Mike Dines of the Duke City Cyclists.

It was Mike and 1960 British Olympian, George Gamble who had raced as a pro in Europe, who convinced me to try racing bicycles in July 1968. Mike drove his Volvo to help me pick up my first pro road bike on July 2, 1968, a Peugeot PX10 for \$150, and took it to his house to set it up for me.

We spent hours in his basement with him setting up the bike and showing me how to care for it. Mike and George were my main tutors in bicycle maintenance for the first few years of racing. I also had other friends during those years that taught me some things but I learned most of what I knew from them.

Bike Shop Experience

In the Fall of 1970, I started working for the only pro shop in Albuquerque as a mechanic while attending the University of New Mexico. I was considered to be one of the best pro mechanics in New Mexico at that time and was to learn even more. A few months later, I quit work-study and went to work for the pro shop on an almost full time basis until I went into the US Air Force in 1972.

When I moved to California in 1984 to start a career in coaching cycling, I applied at a number of bike shops on the west side of Los Angeles. George Garvey, owner of the Marina Del Rey Bicycle Shop, was looking for a coach for the MDR Cycling Club, which his shop was sponsoring. The club had

previously had a national level program and George had been involved in cycling ever since he started his shop 25 years earlier.

When he found out that I was a professionally trained coach and was looking for a job coaching, George hired me as a mechanic under the condition that I rebuild the MDR racing program.

It was because of this that I found myself working in what was at that time one of the best pro shops in the US along side four of the best pro mechanics in the nation. When I went to work at MDR Bikes, I was considered a good mechanic by most shops' standards but was to learn from these people how to be among the best. To understand this, you have to know something about the people I worked with and how they worked.

George Garvey

George was a very intelligent and good person. He loved the sport of bicycle racing and had started his own shop the hard way in the late 1950's. He simply bought a pro frame from Europe and sold it for a profit. He then reinvested the money he made by buying more bikes and selling them until he had saved enough money to start a bike shop.

George was very smart in that he worked very closely with those who also loved the sport and made it happen. This afforded him the opportunity to learn so much from so many people that people began coming to him to learn what he knew.

He also hired the best mechanics he could get his hands on, paid them well to keep them, and treated them well. He then worked with his mechanics to develop a think tank type of operation in his business where he and his mechanics shared what they learned and actually did engineering types of research and studies to learn more and improve methods. I will discuss of few of the things they did and share some of what they learned in other

chapters. George was one of the best employers I ever worked for. He worked hard, expected you to do the same, and treated you fairly.

George was also very careful to make friends with the best in the business such as Ted Ernst, the owner and mechanics at companies like Medici Bikes, and custom frame builders. His shop and mechanics became so good that they were regular consultants for companies like Campagnolo, Shimano, and others. We all got to regularly test new products before most people even knew they were being developed for market.

Eliseo Guytan

Eliseo was from Juarez, Mexico where he had been very poor as a child. He was very mechanically inclined and wanted to race bicycles but couldn't afford a pro bike himself. He quickly found that he had an unusual talent for working on bikes and managed to develop enough of a reputation that most of the racers would bring their bikes to Eliseo to work on. He was able to save enough money within a short time to buy his own pro bike and raced in Juarez for a number of years before moving to Los Angeles and getting a job working for George Garvey at MDR Bike.

At MDR, Eliseo developed enough of a reputation that he became a regular consultant for major firms. I remember the International and US Presidents for Campagnolo visiting the shop to discuss ideas with him because they were considering releasing a new line of racing equipment the next year. I remember him teaching them about how and why we drilled the spoke holes in hubs and then seeing Campy have recessed holes in their hubs the next year. I was blessed by being able to work next to Eliseo while at MDR Bikes.

Yosh Ashikaga

Yosh was a Japanese/American who was fluent in Japanese and knew the Japanese customs very well. He was an unusually brilliant person with a very technical mind and could remember the most minute details about

components. We used to tease that he probably knew the tinsel strength of every type of handle bar tape.

The truth is that he should have been a rocket scientist but loved bicycling too much. I saw Yosh acting as a consultant for engineers from Shimano and other Japanese companies. They clearly had the utmost respect for him and would literally spend days in Los Angeles consulting and discussing racing equipment with Yosh.

Yosh was an outstanding mechanic but spent most of his time in sales where he could tell you more than you could imagine about any piece of racing equipment you wanted to talk about. The man could talk for hours on just derailleurs.

Ted Ernst

Ted was and still is the owner of the Ted Ernst Bike Shop in Southbay, California. He was a third or fourth generation bike shop owner who had raced professionally in Europe during the 1950's. He had become a dealer, collector, and rebuilder of antique bikes. Ted is still one of the best pro mechanics in the US.

Since Ted operated his shop on an appointment only basis, he would regularly close his shop and come up to MDR Bike to help us keep up with business. This meant that I regularly got to work between Ted and Eliseo with George and Yosh being around all the time. It was an incredible experience and I learned far more about working on pro bikes than I had ever imagined was possible.

In 1984, Compagnolo chose MDR Bike as the official support shop for the 1984 Olympic Games. They and the chief US race support mechanic for Campy, Skip, built all the wheels and bikes used for neutral support for the road races, drove the neutral support cars, and were the neutral support

mechanics for the races. I still have one of the custom built bike and wheel racks used for the road races in the 1984 Olympic Games.

As stated before, we got to test equipment from major companies and one of the things they were concerned with was whether we would sell their products after having tested them. For example, Look brought their first quick release pedals by for us to test them and Yosh handed them to Eliseo to put on a bike for me and handed me the shoes.

I rode the bike with the pedals on it and Yosh asked what I thought of the pedals. I told him that I wouldn't want to use them or sell them because they were too easy to kick out of. He turned to the company representative and told him that we would not sell the pedals unless they fixed the problem.

Two weeks later, the company representative showed up with the pedals after a stronger spring had been put in them and I tested them again. I said I thought they were definitely better and would ride or sell them. Eliseo then tried the pedals and agreed with me. The pedals went on the market a few weeks later. We also tested things like the first carbon fiber disc wheels for several different companies.

I worked for MDR Bike until George sold the shop and I started the Los Angeles Racing Team. I left along with both Yosh and Eliseo at the end of 1985. I was informed by the Campy race support mechanic, Skip, in 1984, that, after only working for MDR Bike for the first 3 months, he considered me to be at least one of the top 50 mechanics in the US because of the caliber of the four people I was working with.

Race Support Experience

Through MDR Bike and later with my racing program, I worked regularly with the race support mechanics for the USCF, Compagnolo, Shimano,

Mavic, the top US pro teams, and at least one European team mechanic. This provided me with a different perspective on being a pro mechanic.

The bike shop was where you treated pro bikes like expensive automobiles such as a Rolls Royce. As a pro race support mechanic, you work on bikes with the attitude that they are tools you use to win races with and treat them the same way you see the pit crews for car racing treat their cars.

In the shop, you use the right tools and do delicate precision work. At the race, you use whatever will get the bike working well enough to get the rider back in the race as quickly as possible and to the finish line.

This often means beating, bending, and other manipulations to get it good enough to race on. The standing joke among race mechanics is that you can't be a mechanic if you don't have a big enough hammer.

In the shop, you straighten wheels with a spoke wrench on a truing stand. At the race, you place the bottom of the wheel on the ground, put your foot or knee against the hub, pull back on the top of the wheel to bend it straight enough to fit between the brake pads, say something to the effect, "There, that will do", and push the racer back into the battle.

In the following chapters, I will teach you things from both jobs.



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Part V • Chapter Two

Bike Fit

Bike Fit

I am writing this chapter about frame size and bike fit at the request of a number of cyclists and realizing that (1) there are many unprofessional and/or unscrupulous people in bike shops and (2) bad articles are regularly written about bike size and fit in cycling magazines.

Therefore, there is a lot of misinformation and many myths in cycling concerning frame size and bike fit. I realize that many need this chapter.

In reading this page, remember that I studied human anatomy and Kinesiology (biomechanics) in college. As a matter of fact, they were two of my best and favorite subjects. I easily obtained A's in both classes. I have used these sciences over the last 35 years to study the subjects of frame size and bike fit.

I was already racing bikes at the time I started studying sports sciences in college at one of the top five ranked sports sciences programs in the US and directed as much of my studies as I could toward better understanding bicycle racing from all scientific aspects. This was because I had already decided that I wanted to be a coach in professional cycling and I wanted to be the best coach I could be.

In understanding frame size and bike fit, the first thing you must always keep in mind is that the size of the frame and fit of the bike must deal with the three basic contact points of the human body on the bike. These are the pedals, saddle, and handle bars. Nothing else matters.

The reason I say this is to destroy the first and one of the most common myths about frame size and bike fit. This myth has to do with looking for your hub in relation to your handlebars.

Since the head does not make contact with the bike (if yours does, you really got screwed), then the length of your neck, shape of your head, or position of your eyes in your head should in no way be a factor to determine frame size or bike fit.

If anyone sits you on a bike and tells you to look for the front hub or you are reading an article which tells you the same in a magazine, walk away from it right there because that person is telling you they know nothing about proper frame size or bike fit. I would not listen to another word they tell you.

Frame Size

The most important thing to consider in determining the size of the frame is the distance between your contact points with the pedal and the saddle. Therefore, the distance between the ball of your foot and groin is the distance that is most important for determining frame size.

The basic rule of thumb for determining the size of a road frame for an average built male is to measure your inseam from your groin to the floor in stocking feet. You subtract 10 inches (25.5 cm) from this measurement, convert it to metric, and it will be the correct frame size when measured from the center of the bottom bracket to the top of the seat tube.

It is that plain and simple **except we aren't all average built males.**

For people who's feet are large for their height, add one centimeter. For people who's feet are small for their height, subtract one centimeter. This is because your feet fit in the space between the saddle and the pedals and must, therefore, be considered in determining the frame size.

The legs of the average female are longer for the same height than are the legs of the average male. Therefore, the average built female should subtract one centimeter from this measurement to obtain the correct frame size or the frame will be too large from the seat tube to the head tube.

If a female has legs that are shorter than normal for a female's height, she should not subtract one centimeter. Use the same technique used by the average male.

If a male has legs that are longer than normal for his height, he also subtracts one centimeter. If a male has legs that are shorter than normal for his height, then he adds one centimeter.

Arms and hands which are out of the normal proportions are normally dealt with by stem length or a custom built frame. This is most commonly dealt with in bike fit.

The frame size for a track bike should be one centimeter smaller than for a road bike because the seat tube is more vertical pushing you about one centimeter higher.

I am not that familiar with the frame sizing on a mountain bike but I believe you do something like subtract about 4 centimeters from the frame size of a road bike and measure it the same way. This is because the top tube has to be much lower since you often have to dismount on irregular surfaces and

want to decrease the potential of hard impacts by the groin against the top tube. The frame geometry is set up to compensate for the lower top tube.

Bike Setup

Saddle Position

When setting up the bike, you determine the height and forward-to-rear position of the saddle based on the position of the rear of the kneecap in relation to the axle of the pedal and the bend in the leg at what is called the "2 O'clock position".

To determine the height of the saddle, move either foot to what would be 2 O'clock on the face of the clock if your cranks were the arms of a clock and looking at the bike from the right side of the bike. When your foot is in this position, the inside angle between your leg **BONES** at the knee joint should be just a little less than 90 degrees.

DO NOT determine this bend based on the distance between the muscles because they vary too much in shape from one person to the next. This angle **MUST** be based on the estimated bend in the leg bones.

The reason for this is because of two things. First, we know that the power point of the bicycle crank arm (the point where you will generate the greatest downward thrust) is at the 2 O'clock position. Second, the position in joint angle at which your legs and arms are strongest is when the angle between the bones is 90 degrees. Therefore, you are matching the power point of the legs to the power point of the bicycle. In a manner of speaking, we are marrying the body to the machine so they can function as one unit.

To determine the forward to back position of the saddle, place either pedal in the 3 O'clock position. Then place a string with a weight on one end just

behind the kneecap so that the weighted end of the string hangs down past the pedal of that leg.

For the average built male, the string should hang from behind the kneecap down through the center of the pedal axle with the ball of your foot over the axle. Here you are aligning the power point of the leg with the power point of the foot and the center of the axle.

For the average female or a male with long legs, the string should hang just in front of the pedal axle with the ball of your foot over the axle. For a male with short legs, the string should hang just behind the pedal axle with the ball of your foot over the axle.

The remaining saddle position has to do with the tilt of the saddle. It is simple for everyone.

Stand the bike upright, place a carpenter's level on the saddle with it touching the nose of the saddle and the back edge of the saddle. When the bubble in the level is centered, you have the correct tilt for your saddle. If not, you will either hurt your groin or hands on long rides.

If the nose of the saddle is tilted up too much, you will hurt your groin because too much weight is being placed on your groin (this is probably what is causing sterility in 1 out of 5 males.) If the saddle nose is tilted down too much, your hands will hurt because too much weight is being placed on your hands.

If you have very abnormal anatomic structures such as unusually long lower leg bones or unusually short upper leg bones, you really need to get a professional of the best quality at either a pro shop or a custom frame builder to set you up.

Stem Length And Position

For this you really need a good sizing stem with the correct size handlebars. A sizing stem has an adjustable length for the top of the stem. You can usually get them from good pro shops. Every club and coach should have one and learn to use it. I still have mine.

You want to adjust the length of the stem until you are comfortable with about a 30-degree bend in your elbows with your hands on the brake hoods (again, with the bones.)

You must have this bend or the road vibrations will work directly up your arms to your shoulders and neck muscles causing severe neck muscle pain and head aches. You **DO NOT** want straight arms because the bend in the elbow permits the arms to act like a shock absorber.

For most people, the height of the stem should be such that it is just below the nose of the saddle when looking at the stem from the front. Most people can have their backs straight with a proper stem position but some of us will have a hump because of our anatomy. Therefore, get the back as straight as is comfortable and quit. **Perfectly flat is not required.**

Records

To make your next bike fit easier or to quickly set up your bike after an overhaul or traveling, keep records of some key measurements for setting up your bike.

Keep the following measurements in a pocket spiral notebook:

 Frame size;

- ✚ From the center of your bottom bracket up your seat tube to the top center of your saddle;
- ✚ Handle bar type and size;
- ✚ From the tip of your saddle to the center of your handle bars at the stem;
- ✚ Stem size;
- ✚ Stem height from the top of your head tube to the center of the horizontal part of the stem along the vertical part of the stem.

Keep one notebook in your toolbox for when you travel and one at home in a safe place. It will save you a lot of time and trouble. You can keep other important information such as shoe type and size.

Old Trick For Young Dogs

Have you ever hit your knee against the end of your handlebars while standing to climb or attack? I don't because of an old trick taught to me by Mike Dines that seems to have been forgotten in US cycling.

Before you tape your bars, place your hand on the flat of the bars behind the hooks. This is on the bottom flats just before the end of the bars. You want your hand to be all on the flat but just behind the first part of the bend for the hook.

Mark the bars just behind the back of your hand so that you have at least enough flat for your entire hand. Cut the rest of the bar off because you don't need it, it is dead weight, and you will hit it with your knee when standing. Be sure you get a good square cut or you will have trouble with your bar plugs.

If you have bar plug shifters like me, measure the fixed part of the shifter that extends out of the bars but not the moving lever arm. Cut that much more off the end of the bars so that you will have enough flat bar with the heel of your hand resting on the fixed part of the shifter.

This saves even more weight and moves your shifters farther forward so you wont be as likely to accidentally shift your gears while standing which adds all kinds of excitement to your riding.



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Part V • Chapter Three

Strength & Weight

Strength & Weight

For a long time in cycling, possibly since competitive cycling began, there has been a tendency on the part of at least some cyclists to obtain the lightest possible or "ultra light" equipment.

Over the last 20 to 30 years, there seems to be even more emphases towards this quest for weight reduction at any cost. I wish to address this issue with some common sense on this page.

The first and most important thing you have to keep in mind when thinking about the weight of equipment is that a decrease in weight means a decrease in the amount of material used to make that component or a change in the material used to make that component. Any time we decrease the amount of a material used to make a component we are also decreasing the potential strength of that component.

It should also be pointed out, that changing the material a component is made of to decrease its weight, also has a tendency to decrease the strength of that component because most lighter materials are weaker materials since lighter means the material is usually less dense and, therefore, may have less strength.

How significant is strength?

I know that most of you, especially the recreational cyclists but also many racers, see your expensive racing bicycle as a luxury item. But you must also learn to see it as a tool used to perform a desired task with that task being the transportation of your body over a given course to a desired designation. You must learn to see it as a tool which must endure a given stress load in order to accomplish your desired task, especially for racing but also for recreational cycling.

Therefore, the tool we call a bicycle must take a beating in performing a desired task. The question then becomes how much of a beating must it take to accomplish that task.

Even for recreational cycling, the bike must take a significant beating with the amount of beating it must take being dependent on how hard and how much you ride the bike. An elderly couple cruising a bike path on the beach will give a bike very little of a beating where as a very serious recreational cyclist will give it much more of a beating and the professional racer will give it the greatest amount of a beating.

The bike and its components must be able to take the required beating and still perform the task. Any tool that cannot take the beating required to perform the task it is meant for, is a useless tool. It is trash regardless of how much you paid for it. Therefore, if your \$3,000 professional bicycle cannot perform the task it was meant to perform and you desire it to perform, then you have \$3,000 worth of useless trash.

This means that you must always keep in mind whether a bike or component can accomplish the desired task regardless of how much you pay for it.

In the Men's Road Race at the Montreal Olympic Games, the race favorite, a rider from Germany, decided to go with a new ultra light chain to save a few

grams of weight. He made the winning break, was expected by everyone to win, and, in the closing laps of the race, his wonderful chain snapped.

I remember him standing on the side of the road with his disfunctional racing bike, sobbing as the gold medal eluded him because of a few grams of missing steel in his chain.

After the race, Eddy Merckx stated that the most important aspect of any bike or component is dependability. A piece of equipment is no good if it cannot get you to the finish line. He went on to make an example by stating that he always rode a slightly heavier tire to make sure he got to the finish because less weight means nothing if it won't get you to the finish of the race. Basically, you can't win if you don't make it to the finish. I have never seen a bike racer win a race from the sag wagon.

This is just as true for a recreational cyclist. Imagine yourself doing a tour and finding yourself stranded in the middle of nowhere with a broken component unable to get anywhere much less where you desired to go. How much value will that ultra light component have to you as you watch others ride by you enjoying their ride and you not enjoying your ride?

How much more would you have enjoyed the same ride with the slightly heavier piece of equipment without the same problem?

Therefore, your most important question when purchasing any cycling tool should be, "Will this tool accomplish the desired task?" If it cannot perform the desired task, then it is a disfunctional tool.

Here in the US, following Eddy Merckx's successful hour ride, some one started a rumor that Eddy had drilled out everything on his bike to save as

much weight as possible. This caused an insane epidemic of people drilling out their racing equipment to save weight.

I personally obtained a number of large and clear pictures of Eddy on his bike before, during, and after his hour ride. It was easy to see from the pictures that **ALL** of the equipment on his hour bike was standard factory issue and that he had not custom drilled one component to save weight.

Yet, most people blindly believed the increasing rumors without checking them out. I saw people doing incredibly dangerous things like drilling out the stems on their bicycles, which have to take a tremendous amount of stress when you realize that the handlebars act like levers torquing the stem with incredible amounts of force.

I had a friend who bragged to me that he had taken an ultra light pair of 200 gram rims designed for Criterium and track racing, drilled large holes between the spoke holes, and was using them for road racing on courses where he regularly encountered pot holes, cattle guards, and rail road tracks.

I told him that the best thing he could do was to drill his tires out to keep him from hurting himself and, if he really wanted to save weight, he should drill out his water bottle. It would make as much sense.

Since then, I have seen dozens of ultra light components hyped as super components by the cycling media simply because of them being a few grams lighter prove to be worthless trash that wouldn't last 500 miles. I have seen plenty of ultra light derailleurs fail and even end up in rear wheels because they snapped during a ride or race.

I have seen racers and teams discard sponsored equipment because it couldn't do the job. I have seen untold numbers of components come and go because they were nothing more than ultra light trash hyped up by the media.

The goal in purchasing such equipment is to improve performance by saving weight. Let's examine this from a proper perspective.

The average beginning racer can sustain a jamming speed of from 18 to about 22 miles per hour (28 to 35 kph.) On the other hand, a good pro should be able to race at 35 mph (56 kph.) I **DARE** anyone to increase their maximum speed on a bicycle by just ten miles per hour (16 kph) by decreasing the weight of their bicycle and components. It is scientifically impossible.

The best you can hope to achieve in increased speed for even climbing by decreasing the weight of your bicycle is about one or two miles per hour but even that would require a complete overhaul in equipment. The only way you can improve your racing speed by more than a few miles per hour is to increase your body's fitness level. As a matter of fact, if you put a pro on a \$600 touring road bike, he will beat a cat 4 racer riding on a \$4,000 ultra light racing bike every time.

For intimidation purposes, I used to love to do my flat, off season, group training rides on a 52 pound, 1968 Schwinn Varsity. It destroyed their minds for the next season and really helped build a lot of strength. Therefore, it should be common sense that you should spend more time and money improving your body than improving your bike because you can achieve the greatest level of improvement in your body.

My suggestion for beginning to intermediate level cyclists and what I always taught my beginning level racers when they came into my program is to get a decent level road bike. It doesn't even have to be a pro bike. A \$600 to \$800 road bike will do for starters.

This is especially true if you realize that a beginning racer is more likely to crash and destroy his bike than a more experienced rider. Therefore, you don't want to buy a bike and equipment you can't afford to replace or repair when you start racing.

Get a good beater road bike or used pro bike to beat up until you get close to where you want to be in racing.

Let's say you are a weekend warrior and just want to become a really good cat 3 amateur. When you get to where you can **CONSISTENTLY** finish close to where you want to be, **THEN** you start worrying about the bike. Even then, keep in mind that the bike and equipment must be able to do the job. You have to be able to get to the finish line to win the race or be able to complete the tour to be able to enjoy the tour.

I had my Juniors racing on \$500 used team road bikes and they were consistently beating the Juniors racing on \$2,000 to over \$3,000 pro bikes.

Let me give you a little clue about how the industry works. If you get to where you can consistently beat the best pro bikes with a junker, the bike companies will **GIVE** you a new pro bike to get you off that junker because **THEY DON'T WANT PEOPLE TO SEE YOU BEATING THEIR PRO BIKES ON JUNKERS!!!** How can they possibly justify charging you \$3,000 for a bike that is consistently being beat by a piece of junk?

So, if you can't afford a \$3,000 pro bike, get a junker bike, spend a few hundred dollars getting your body in shape, and kick butt until some one decides they don't want to see you beating their pro bikes with that junker any longer. You will get the better body and the better bike for just a few hundred dollars. If they want to keep selling pro bikes for \$3,000, they have to get you off the junker. It works.

You have to understand that a huge part of the bike industry is built around getting people to believe their three-year-old pro bike is just too out of date and can't compete against the latest models so they can sell you a new pro bike. It is difficult to convince people of this if the new pro bike is getting beat by junk.

They used to have a system in Mexico that worked really great. It was based on the fact that most of the people were too poor to buy a pro bike or, in many cases, even a bike of any kind.

The teams didn't have much money or sponsorship to help people out. Therefore, when a new racer came into the sport that couldn't afford a bike, they put him on a piece of junk to learn and develop with until he proved he was good enough to warrant a better bike. A poor rider could ride half a dozen different bikes before earning a really good pro bike.

It was amazing to see us Americans getting beat or passed in the peleton with all our expensive equipment by young kids on real junk like very used Sears 10 speeds with the kid wearing tennis shoes, cut off pants, and a T-shirt. It really drove home the significance of the body in relation to the significance of the bike.

On the Los Angeles Racing Team, we took the same approach to racing. If a rider couldn't afford a pro bike to start racing on, we would arrange the sale of a used bike or sponsor him/her a junker, especially for Juniors.

What do I tell a person to look for as a minimum quality in bike for beginning racing?

A bike with 700c wheels, tires that will hold at least 110 psi, and pedals that will take the beating you will give them. That will get you started.

Don't worry about how smooth the shifting and braking will be because, as a beginner, your shifting and braking won't be smooth enough for the equipment to make that much of a difference anyway.

Fix your body and then we will talk about the bike.



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Part V • Chapter Four

Tires & Gluing

Tires & Gluing

Your tires are one of the most important parts of your bicycle but often most neglected by racers and recreational cyclists alike. They are the medium between your bike and the world you ride on. They guide you, carry you, and are a thin line of rubber between you and disaster.

The single most important aspect about your tires is dependability. If you cannot depend on your tires, they are a threat to you. It is always better to pay a little extra for a tire which will be sure to get you there than to be a little too cheap and find yourself walking or, even worse, crashing.

On the other hand, following the wrong tire fad can also leave you in trouble.

I remember when the bald tire fad started. I was given some new tires to test for a company which I had to throw away after less than one hundred miles because I couldn't get more than ten miles from home before I had used up all my spare tubes and most of my patches.

I quit riding them when I realized that the rubber was so soft that they would actually pickup and carry BB sized and shaped pebbles and hold them long enough to cause a puncture. What good is even a free tire if it turns your riding into a nightmare of tire related stops to keep fixing flats? The last time I rode them, I had to stop 4 times in the first six miles of my ride. I prayed all the way home and only had to stop twice more.

In cycling there are two basic types of tires. We call them clinchers and tubulars or sewups. When I first started racing, there wasn't a clincher tire light enough to use for racing. All we had were sewups.

For those of you just entering the sport, a sewup or tubular is a tire where the tire casing is literally sewn around the inner tube and the entire unit is glued to a special rim. The clincher is the standard beaded tire you use on your car that is kept attached to the rim by a combination of air pressure and a bead.

There are some industry standards for choosing sewup tires. Most racing and some training tires are made of silk casings sewn around a very thin inner tube we call a silk or silk tire. Some racing tires and most training sewups are made of a cotton casing.

When I first started racing the cottons were all too heavy to race on so we trained on cottons and raced on silks. The silks tend to still be favored by most because the casing is a little stronger. An added disadvantage we found to cotton tires was that the casings tended to rot during the off-season and would puncture or even just blow out more easily in the spring. We didn't have that trouble with the silks.

The standard weights recommended for use depended on what you were using them for. Most people used a heavy 300 to over 400-gram cotton tire for training. I found that I could get enough extra miles out of a good 270 to 290 gram silk that for only about \$7.50 to \$8 a tire as opposed to the \$4 for cotton, they were worth it.

Today, the prices are so much higher for any sewup that most people don't even bother to train on them. Plus there is the added bother of gluing them on the rim and fixing the flats. Most people use clinchers for training. They are easier to use and more cost effective.

The standard weights I recommend you look at for racing on sewups, or clinchers for general road racing, that will be dependable and fast enough is a good 270 to 290 gram tire. For Criterium racing, you will probably want about a good 220 to 260 gram tire.

Some people like to go as low as a 200-gram tire but I found the extra risk in puncturing did not provide that much extra speed for them to be worth it.

For track, you will use a 220-gram tire or less depending on your event. If you want to use sewups for recreational riding, I would recommend a 270 to 300 gram silk or 270 gram to 400-gram cotton. You will find that the lighter weight tires tend to wear out too fast for much road usage. They are made for very high speeds and acceleration at the expense of wear and dependability.

When I trained with Tom Garrety, he was sponsored 220-gram silks' at such a rate he could train on them, get a flat, and toss them. I was poor enough that I stood where he was throwing them and had some really great racing tires for some time to come, which only cost me the trouble of fixing the flats. The trouble was that they only lasted about 500 to 600 miles when new.

For racing on the road, you will want a tire that is about 23 millimeters in diameter and inflates to about 100 to 120+ pounds per square inch. For Criterium racing on good roads, I would recommend about a 20 to 23 mm tire, which inflates to at least 120 psi.

Track racing again depends on the event. The sweetest ride I ever had was on 16 mm tires pumped up to 200 psi for the kilo. You had to hang onto the bike to stay with it.

Recreational cyclist should look at about the same tire size and pressure as for road racing unless you are riding on some rough roads or want a little

softer ride. Then you go to about a 28 mm or wider tire with about 100-psi inflation. You also have to consider how much baggage you are carrying on the bike. The more baggage, the more tire you will need.

Stretching The Tire

Before you begin anything else, you need to stretch the sewup tire. The cottons need a little more stretching than the silk tires because they are not as elastic in nature. As a matter of fact, an experienced person can mount a lightweight silk without stretching and you want to be careful to not stretch the silk tires too much.

The easiest way to stretch the tire is by using your hands and either a stocking or bare foot. You hold the tire at one end with your hands while placing one foot inside of the tire on the other end. You push down with your foot while pulling up with your hands. Then you rotate the tire one-quarter turn and repeat the process.

With heavy weight cotton, you will probably want to do this to the tire at least one to two full revolutions of the tire. The easiest way to tell if the tire is stretched enough is to mount it on a dry rim and see how hard it is to get on.

Another way to help with the heavier cottons is to place it on a spare rim after stretching it, pump the tire up to about half its recommended pressure, and leave it over night. A good thing to do is to save a pair of rims you have cut out of wheels for stretching tires.

Gluing The Rim

This is something a lot of people don't know how to do right. How you glue a tire depends on how you are using it.

For the first part of this discussion, I will assume a brand new rim, which has never been used, and the use is for road racing. The first and most important rule in gluing a tire is that the glue must cover the entire rim surface where the tire rests. If you have ever removed a sewup, you know that the trick to getting it off is to break a small place loose on one side and the rest of the tire will follow with much greater ease.

This should tell you that, if there is a clean spot any where on the rim, it will be very easy for just a little pressure to begin the tire to move away from the rim at that point and then it is gone. You will have rolled a tubular. I was taught the technique I am going to teach you when I first started racing, it was also used at MDR Bikes, and is used by more knowledgeable mechanics. With this technique, I have never rolled a tire.

You need to apply the glue over the entire rim face where the tire will be seated in a series of very thin layers. If the layers are too thick or you rush the job, you will get glue on the sides of your rims. But let me state that it is better to get a little glue on the sides of your rims from just a little too much glue than to get your butt on the asphalt from not using enough glue.

The best way is to use your finger to carefully spread a very thin film of rim glue between the spoke holes and around the spoke holes so that not one square millimeter of rim surface where the tire rests is left uncovered. It is very important that you also spread the glue between the spoke holes and the edge of the rim because any space where there is not glue permits the tire to start to move and, once it gets started, it will roll.

I have seen glue jobs done by cheap bike shops that are more interested in saving a few dollars on a little extra glue than with doing the job right. I have had to help pick too many of their customers up off the road at races. Some have only applied a dab of glue between the spoke holes and let the tire spread the glue when they put it on. It is only a matter of time and these tires will roll. For these reasons, I personally prefer to glue my own

tires on because I hate crawling on the asphalt at 30+ miles per hour. It is worth the time to do it right.

After you have finished applying the first layer of glue, let the wheels set over night or for 24 hours. Then I repeat the process by applying a second layer of glue over the first layer being sure to cover every square millimeter of the rim. I let it set for another 24 hours before finishing the job.

On the last night, I first apply a thin layer of glue to the rim tape on the tire because the casing of the tire will absorb the moisture from the glue causing it to dry out and lose its adhesiveness. The layer on the rim tape will lose its moisture to the tire casing but will share the moisture with the fresh glue on the rim causing it to remain adhesive. I let that dry while I apply a third layer to the rim. When the third layer on the rim becomes tacky to the touch, I mount the tire on the rim.

The reason I prefer to use three layers on the rim is because, when you pull the tire off, it will normally pull off one or two layers of glue. If you only put on two layers and the mechanic has to make a quick change at a race, it could leave a bare spot on the rim, which would cause the tire to roll. The third layer makes it possible to place a spare, previously glued, tire on a rim and race on it.

You have to understand that I started racing when we didn't have support vehicles following the race so, when you got a flat in a race or even when training, you had to change the sewup and either get back in the race or just go home. When you changed the sewup, you wanted to know it wouldn't roll when you chased the pack down and got back in the race.

We always carried one or two spare tires under our saddles, which had been previously glued so they would stick to the glue on the rim. Most of us carried these tires in an old sock so that dirt from the road wouldn't get on the glue and cause the glue to not hold after you put it on the wheel.

The more experienced of us carried tools in the sock (at least when training) so we could fix any problems on our bikes and get home. Besides, the sock also served as a grease rag so we didn't have to wipe grease and grit on our shorts and jerseys. Old habits die-hard.

To this day, when I train, I carry a sock with a folding tire (in case I slit a casing), tubes, a patch kit, and tools so I can get home from anywhere. Here in New Mexico, I train on roads where I could wait for over an hour for a car to come by with a 50% chance it will be going in the wrong direction.

Mounting The Tire

The technique for mounting the tire is simple but you have to be careful and patient to keep from making a mess. If you have never mounted a tire before, practice with a dry rim until you get the feel of it. If you don't, you can make a real mess the first time you try to mount a sewup on fresh glue.

You can end up with your house, the dog, and the cat stuck to the rim. :-)

Put on an old pair of shoes you don't mind messing up. Place the wheel in front of you standing on the floor with one side against your legs and the other side facing away from you. You should be bracing it up with the insides of your feet and legs and the stem hole should be at the top.

Take the tire starting with the stem and holding the tire so that only the part of the tire you are placing against the rim will touch the rim. You must slowly control how much of the tire you permit to touch the rim and you will be "feeding" the tire onto the rim. You should be holding the tire so that your hands are rotated out with your thumbs and index fingers facing to your sides and the heels of your hands facing towards each other.

You will use the heels of your hands to stretch the tire onto the rim as you mount it a little at a time. The tread of the tire will be in the palms of your hands with your fingers and thumbs holding the sides of the tire between the tread and the rim tape so that you are not touching the glue on the rim tape.

You will carefully place the stem through the stem hole while carefully placing the rim tape of the tire onto the glued surface of the rim. You will start with about 6 to 10 inches of the tire being applied to the rim surface while holding the tire so that the rest of it is hanging down the side of the wheel, which is facing away from you. You will slowly and carefully pull the tire out towards your sides and down against and around the rim a little at a time being careful to place the rim tape on the rim surface until you get to where there is about a foot of tire not mounted.

At that point, you will have to carefully change your hands so that your thumbs will be against the tread of the tire with your fingers holding the sides of the tire. In order to mount the last bit of tire without smearing the glue from the rim tape all over the sides of the rim, you will have to manipulate the tire so that you will first turn the tire so the rim tape is facing towards the outside of the wheel and as it clears the sides of the rim, you turn the tire so that it flips down onto the rim surface in place a little at a time. Don't rush it.

After the tire is mounted, check to make sure that the rim tape is square on the rim and then inflate the tire just enough to make it round. Then further adjust the tire's position on the rim, inflate a little more, and leave it over night.

With regular rim glue, it will need to set at least 24 hours to be safe. You need to know that, not only does fresh rim glue not hold very well, but also it is actually slick and will make the tire slide on the rim so that one of two things will happen. First, in a nice fast corner, it won't roll off the rim. It will

slide off the rim. Second, if you do a lot of braking like on down hills, the tire will slide around the rim bunching at the stem causing the tire to stretch and bulge until it explodes.

One time, I let a friend talk me into "saving" a little money on some cheap glue. The heat from the rims caused by braking on a fast, 13 mile descent with switch backs caused the cheap glue to melt and the braking action caused the tire to slide around the rim and bunch around the stem causing the tire to stretch and bulge so that I had to quit riding half way down the mountain and catch a ride home.

The pennies I saved on the glue cost me a new sewup because it was ruined. I have never used cheap glue since.



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Part V • Chapter Five

Wheels

Wheels

The wheels are probably the single most important part of the bicycle. Therefore, I feel it is necessary for you to properly understand at least the basics to wheel science before we get into wheel building.

Basic Wheel Construction

When we refer to a two, three, or four cross wheel, we are referring to the number of spokes on the same side of the wheel which one spoke will cross between the hub and the rim. This tells us what the weave pattern is for the spokes and the wheels.

For example, when traveling from the hub to the rim on a three cross wheel, each spoke will cross over and under three other spokes. This is important because each spoke that one spoke makes contact with will share and dissipate some of the force felt by that spoke when riding. This increases the strength of the wheel.

You have to understand that the more spokes a spoke has to cross, the further the spoke must travel between the hub and the rim, and the longer the spoke must be increasing the amount of metal in the wheel and the weight of the wheel. The inverse is also true.

A radially spoked wheel is constructed so that no spokes cross any other spokes between the hub and the rim. The spokes travel straight out or radially from the hub to the rim. This wheel design has minimal strength and minimal weight because the spokes are shorter and don't share stress.

Disc wheels are wheels where the spokes are replaced with a circular sheet of material such as carbon fiber or aluminum to connect the hub to the rim and provide support. This design eliminates the wind resistance of the spokes in exchange for a decrease in lateral maneuverability or control.

Bladed spoke wheels are composed of either flat or “bladed” metal spokes or three or four carbon fiber spokes shaped like a blade or aircraft wing running between the hub and rim for support. This is to increase the aerodynamics of the wheel over the normal spoked wheel with a little better maneuverability and control than the disc wheel.

When selecting or designing wheels, there is always a trade off and you must decide which trade off you want to make. The reason for this chapter is to help you better make that decision.

Strength

The wheel strength is the single most significant characteristic of the wheel. The racing industry easily recognizes this.

I knew a mechanic who worked for one of the top pro teams in Europe and he told me that, when racing the cobbles of Paris-Reaubaix, better than 80% of the pro teams use heavy 400 gram, 40 spoke rims with a four cross construction and heavy duty tubulars to increase their riders’ chances of making it to the finish. They know that you can’t win the race if you can’t get to the finish line.

The first and most important thing in designing or selecting wheels is to know that they will get you safely to the finish so you can win or just get you home. Anything short of that is guaranteed failure. But this also has to do with safety because, if a wheel fails in a race or on a ride, it can easily take you and others with you down causing injury or even death.

The basic concept in determining required wheel strength is that the greater the beating the wheel will have to sustain, the greater the strength is required in its construction.

If you plan on riding or racing on roads where it can get rough and the wheels must survive a beating, you have to have stronger wheels. If you are going to give the wheels a lot of beating with slamming through corners or a lot of attacking, you have to have stronger wheels. If you are doing a time trial on really great roads where the wheels will get minimal beating, you can trade some strength for speed. These principals should be common sense and you have to use common sense in selecting your wheels. Don't get yourself hurt with wheels that won't get you there anyway.

I had a friend who got carried away with the drilling fad in the 1970's. He got really stupid and drilled holes on the inside of his tubular rims with very light 200 gram rims and was using them for racing on rough roads. I told him that the best thing he could do for his own safety was to also drill out his tires so he wouldn't get hurt. Don't get stupid; it will get you hurt.

Your size is also a factor in determining required wheel strength. A really big man weighing 200 pounds requires much stronger wheels than a 110 lb woman.

For example, if I was racing at 170 pounds, I would use 36 spoke wheels with three cross spoke construction for general road racing where the road got rough. For general Criterium racing, I would use a 32 spoke wheel with three cross in the back and maybe two cross in the front. If I knew the Criterium course was really safe or I was racing track, I might drop to a 28 spoke wheel on the front and 32 spoke wheel on the back.

For time trialing on a good course, I would use 28's front and back with maybe a two cross on the front and three cross on the back. But you may prefer more risk and less safety.

There is a little something that the people selling you trick bicycle wheels don't want you to know about wheel construction. The fewer spokes you have in your wheel, the further the rim will move or travel when a spoke breaks.

It is also true that the greater the spoke tension, the further the rim will travel when a spoke breaks. With most regular wheels, if a spoke breaks, the rim travel will be small enough so that you can easily release the brake quick release and continue to race and even win the race. But, if you have too few spokes in your wheel or too much tension on the spokes, when one spoke breaks, the rim will travel far enough and make hard enough contact with the brake pad that, even with the quick release released, your race is over and you get to watch the others race.

The rule of thumb here is that, if you have 28 or more spokes in your wheel with the right tension, you will be able to release the brake quick release and still win the race when a spoke breaks. But, if you have less than 28 spokes, your race is over and you will get to watch everyone else finish the race. As a matter of fact, if you have too few spokes or too much spoke tension, one broken spoke can cause enough tension imbalance to cause the rim to travel enough to one side to cause the wheel to collapse to that side or "potato chip" damaging or destroying your wheel.

This can be particularly bad when on a training ride or recreational ride because a potato chipped wheel means you get to walk home. So, if you have wheels with too few spokes or too much tension, be sure to carry a good pair of walking shoes when you go riding so you can get home. Dependability is first.

Weight

Most people think a lighter wheel is always better but this is not true. Above, I covered the issue of safety but there are certain aspects of weight in relation to performance you must also consider.

A light wheel weight is most crucial when climbing or accelerating. It requires more energy to move a mass against gravity or move that mass from a lower speed to a higher speed. Therefore, wheel weight is most important in races which will require the most acceleration and climbing but will be least significant in races or rides on flat ground with a steady pace.

As a matter of fact, a heavier wheel will help you maintain a higher steady speed on flat ground than a lighter wheel because of the fly wheel effect and can even help you maintain a higher speed on a hilly course if the hills are not too long or too steep.

Once you get a heavier wheel moving, it takes more resistance to slow it down and requires less effort to keep it rolling. You must be aware that there will be a point in weight at which the increased rolling resistance will off set this advantage and the increased weight of the wheel will become a negative factor even for a steady pace on flat ground.

This information is most important for time trialing. For example, the one-kilometer individual time trial is short enough that the acceleration at the start is so much more important for the eventual time than with the much longer 40-kilometer individual time trial. Therefore, it would be more beneficial to have a lighter carbon fiber disc wheel for the one-kilometer time trial but a heavier aluminum disc wheel for the 40-kilometer time trial.

The break-even point for this seems to be at about 3,000 meters. For anything over 3,000 meters, it is better to have the heavier wheel for the flywheel effect.

Francesco Moser used this concept when he set the world records for both the hour and 5,000 meter individual pursuit times by using the heavier aluminum disc wheels because of the flywheel effect. All he had to do was get the wheels turning and keep them turning and the flywheel effect helped keep him at a higher speed.

Wind Resistance

There are two aspects to wind resistance concerning wheels. The first and most commonly known is the wind resistance concerning the forward progress through the air by the wheel spokes. It is this aspect of wind resistance for which we use bladed spokes and disc wheels to decrease this wind resistance.

Generally speaking, it is known that the aerodynamic advantage gained by just using disc wheels will decrease your time on a sustained time trial at a rate of two seconds per kilometer traveled. This means that, in a 40-kilometer time trial, disc wheels should save you about 80 seconds on your time. One disc wheel will only save about half that much.

The other aspect of wind resistance has to do with the wind blowing on your wheels from the side. This is particularly important when using disc wheels, especially when riding with other people.

A sudden gust of wind can cause your wheels to move enough to one side to either knock you into other riders or even knock your wheels out from under you crashing you. The lighter your wheels are, the more effect a side wind or gust will have on your wheels.

You have to understand that moving your bike laterally through the air is almost the same as getting a side wind or gust. This effect on your wheels

makes it more difficult for you to corner or make lateral movements and attacks when using disc wheels.

Using disc wheels in a Criterium with fast corners can kill your upper body and decrease your bike handling later in the race making you even more dangerous in a pack.

This effect also means that it will take you a little longer to react to any lateral movement or attack. It will be like trying to have a dogfight with a fighter plane when you are flying a bomber plane.

You are giving yourself a potential tactical disadvantage when using disc wheels in a pack.



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Part V • Chapter Six

Wheel Building

Wheel Building

Starting

The first and most important thing in building a wheel is to make sure you get the right size spokes in relation to the rim and hub type and the desired spoke weave (radial, 2, 3, or 4 cross.) When the wheel is completed, there are several things, which must be achieved.

First, the nipples must completely cover all the threads on the spokes. This is because the two points of greatest stress on a spoke are at the hub flange and the inner edge of the nipple. This is where the spoke is most likely to break.

Understanding this, you should realize that the part of the spoke where the metal is the thinnest and most likely to break is on the threads. Therefore, it should only be common sense that the nipple must cover all of the threads in order to strengthen this part of the spoke and place the stress point on a thicker part of the spoke.

It should also be pointed out that another reason for wanting all of the threads on the spoke covered is because you will have maximum friction resistance between the nipple threads and spoke threads if they are completely in contact with each other to the maximum possible. This will decrease the probability of the spokes working loose while riding.

Second, if you got the right size spokes and built the wheel right, you should be able to look down the top or head of the nipple inside the rim to the

bottom of the slot for the screw driver and the end of the spoke should be about one millimeter from the bottom of that slot plus or minus a maximum of one millimeter.

Tools

Using this building system, you will need the right size spoke wrench, a jewelers common or slotted screw driver with the swivel head, a dishing tool, and a truing jig or your bike frame. You can build great wheels with a minimum of tools.

Drilling the Hub

In the older hubs, the flanges were not designed with a recess for the head of the spokes and some hubs may not have this design today. This causes the spoke to leave the flange at a bad angle, which increases the potential for breaking the spoke at the hub.

They discovered this at Marina Del Rey Bike Shop and I was present when the head mechanic, Eliseo Guytan, showed the national and international presidents of Campagnolo the design flaw and what we were doing to remedy it by drilling the holes in the hub flanges just enough for the spoke heads to sit flush with the flange. The next year, Campagnolo was the first company to have the recessed spoke holes in their flanges and others quickly followed.

If your hubs don't have the recess, you will need to drill the holes just enough for the spoke head to set flush with the flange. Be careful because over drilling will ruin the hub.

Using an Old Hub

It is important to understand that, if you are using a used hub, you **MUST** run the spokes in the same direction in relation to the markings on the hub from the old spokes and use the same weave. If not, then you will increase the probability of cracking or breaking the hub flange at the spoke holes.

In other words, if the spoke from a hole used to run front to back with a 3 cross wheel, the new spoke for that hole must run front to back with a 3 cross wheel. If you don't do this, you could find yourself out on the road with a busted wheel. Be sure to take a good pair of walking shoes when you ride so you can get home. :-)

Wheel Lacing

You want to lace the wheel from one side and then the other side and not both sides at the same time. This in conjunction with the initial tightening of the spokes I will mention in a little bit will result in several things. First, it will cause the wheel to have even tension on all spokes resulting in a faster and more accurate building job. The spokes will literally build, true, and dish the wheel for you.

Second, it will decrease the probability of the spokes working loose and the wheel literally falling apart on the road. I have never heard of a wheel coming loose when it was built using the method I teach.

First, you put all the spokes through the holes in one flange of the hub. Every other spoke should go through the flange from the outside to the inside and every other spoke should go through the flange from the inside to the outside. It doesn't matter which side of the hub you start with for the front wheel but it is best to start with the drive side on the rear wheel.

Before we start building the wheel you need to understand that there has been a long-standing argument about which way to weave the wheel in relation to the forward turning of the wheel for aerodynamic purposes. To my knowledge, this argument has never been satisfactorily resolved so we will ignore it. I will have you build the wheel so that the outside spoke at the hub runs toward the rear of the bike or wheel. This is the most common method.

The weave pattern is described based on the travel of a spoke, which exits the hub to the outside and is called an outside spoke. You describe the pattern as traveling over and under spokes on the same side of the hub referring to the number of spokes traveling in the opposite direct which that spoke crosses between the hub and rim. The weave pattern for a 2 cross wheel is one over, one under.

This means that the outside spoke in that wheel will cross over or outside of the first spoke it crosses and under or inside of the second spoke it crosses before entering the rim. Keeping this in mind, the weave pattern for a 3 cross wheel is two over, one under and the weave pattern for a 4 cross wheel is three over, one under.

Then you start the lacing at the hole in the rim for the valve stem. You may need to reference another already built wheel at this point and it is a good idea to keep good wheel near you so you can check your work as you progress. You need to make sure you have the right spacing for the valve stem so you will not have trouble getting the pump head on and off your valve stem.

When you look at a finished wheel, you will see two different types of spaces facing the rim. One type of space will have a V at the last crossing of the spokes before they enter the rim. The other type of space will have the V at the next-to-last crossing before the spokes enter the rim. The spacing you want for both sides of the wheel at the valve stem hole are the spacing with

the V at the next-to-last crossing before the spokes enter the rim. This will place the V furthest from the rim and giving you more room for working with the stem.

This can be a little confusing so let me explain as simply as possible. Let us assume you are looking at the side of the wheel and want to enter your first spoke to your left of the valve stem. At this point, you need to understand that every other hole on the rim is for the spokes on one side of the wheel and every other hole in the rim is for the spokes on the other side of the wheel.

If you are starting with the right side of the wheel, I want you to take any spoke that has gone from outside to inside and place it through the hole just to your left of the valve hole in the rim. For the initial insertion on all spokes, you only run the nipple down on the spoke about three to four turns leaving the spoke loose. This is just enough to hold the spoke in place. We will tighten the wheel later.

Next, count on the hub from the spoke you just placed in the rim to your right to find your next spoke. It will be a spoke that runs through the flange from the inside to outside. If you are doing two cross, you will count over to the third spoke from the first spoke.

If you are doing three cross, you will count over to the fifth spoke from the first spoke. If you are doing four cross, you will count over to the seventh spoke from the first spoke.

Take this spoke running from outside the hub, weave it inside the first spoke attached to the rim, and place it in the third hole in the rim to the left of the stem hole.

Now, count on the hub from the first spoke to your left to the next spoke passing through the hub in the same direction as the first spoke and take that spoke to the fifth hole in the rim to the left of the stem hole.

Next, count on the hub to the left from you SECOND spoke to the first spoke passing through the hub in the same direction as the second spoke and take that spoke over the first spoke, weave it under the LAST spoke you just placed in the rim, and place it in the seventh hole in the rim to the left of the stem hole.

You continue this process moving away from the stem hole to your left and around the wheel until you return to the stem hole completing weaving the right side of the wheel.

Now, turn the wheel over so you are facing the left side of the wheel. You will notice that the spoke holes in the hub flange are offset from this side to the other side.

Find the hole in the flange on the side you are facing which is just to your right of the spoke on the other side of the wheel which is just to your NOW right of the stem hole in the rim. The easy way to do this is to follow the spoke just to your right of the stem hole on the other side down to the hub and find the hole on your side of the hub just to the right of that spoke. You pass the spoke through this hole from outside to inside and use this hole as reference in determining how you run the rest of the spokes through this flange.

After you have finished placing all the spokes in the flange for this side of the wheel, you now take the spoke just to the right of the spoke on the other side of the wheel which enters the rim just to your right of the stem hole and place that spoke in the rim just to your right of that spoke. The weave for this side will mirror the weave for the other side but be offset by one spoke to your right.

You next follow the next spoke to your right in the rim to the hub on the other side and take the spoke just to the right of that spoke on your side of the hub, run it under the first spoke on this side of the hub, and place it through the next available hole in the rim to your right from the stem hole.

You continue in this manner to your right away from the stem hole around the wheel and back to the stem hole. You have now finished weaving the wheel. This is the toughest part of wheel building to get right so you can always use another wheel to check your work.

Bending the Spokes

At this point, it is important to bend the spokes down against the face or flange of the hub with your fingers. If you don't do this, the spokes will slowly bend down as you ride the wheel and cause the wheel to become loose. Simply go around the wheel pressing or bending the spokes down against the flange of the hub with your fingers. A surprising number of mechanics don't know this.

The Initial Tightening

This is a secret that even most mechanics don't know. The nipples should now only be run down over the spokes just a few turns to hold the spokes in place. The pattern and method in which you tighten the spokes is important because, if you do it wrong, the wheel won't have even tension and the spokes will be much more likely to work loose with riding.

You start with the spokes on ONE SIDE OF THE WHEEL ONLY and at the stem hole. You use your jeweler's common or slotted screwdriver placing it in the screwdriver slot in the head of the nipple inside the rim with the swivel head against the palm of your hand, and quickly spin the nipple down UNTIL IT JUST COVERS ALL THE THREADS OF THE SPOKE. You do this to the spokes on ONE SIDE OF THE WHEEL traveling around the wheel in one

direction. This provides even tension on that side of the wheel with the hub centered equal distance from the rim in all directions. Next, you turn the wheel over doing the same thing to the spokes on the other side of the wheel. The wheel should now be at least 90% to 95% complete with minimal work left to do.

When you finished and, if you used the right size spokes, the wheel will have equal tension all around, the hub will be centered in the wheel an equal distance from the rim in all directions, the wheel will basically be true, and spokes will be snug but not tight

If you have done this right, all you will need to do is fine-tuning and pre-stressing the wheel for it to be race ready. You will have saved yourself at least an hour of work over other methods. You will be amazed at how fast and easy the wheel will just “fall into place.” If you don’t use this method, you will never get equal tension in the wheel and can take hours to center the hub and true the rim.

After George Garvey sold the Marina Del Rey Bike Shop and Eliseo and I left the shop, Eliseo contracted to hand build a large order of racing wheels for a customer in a short period of time. He hired me and, using the method described in this chapter plus a special drill bit he made for running the nipples down, we hand build, trued, pre-stressed and delivered, race ready, 400 wheels (200 pairs) in just three 12 to 14 hour days. If the assembly is done right, the wheels require very little truing. They just seem to fall together.

This may sound outrageous but, if you do the math, you will see that it is really practical. With this system, you should easily be able to insert a spoke in less than five seconds. Five seconds times 36 spokes is only 180 seconds or 3 minutes to lace a wheel. It shouldn’t take you more than one second to bend a spoke or another 36 seconds to complete the wheel. You are now at 3 minutes 36 seconds.

Using a drill with a custom bit, it should take you no more than two seconds per nipple to run the nipples down over the threads, which would be 72 seconds or another 1 minute 12 seconds. You are now at 4 minutes 48 seconds and the wheel is almost finished, IF YOU BUILT THE WHEEL RIGHT.

It shouldn't take you more than five minutes to fine tune and pre-stress a wheel built this way because, building the wheel this way causes the spokes to automatically shape the wheel so that it is dished and trued with the hub properly centered in the rim. The fine-tuning will just be touching the rim up and then you only have to pre-stress it. Since you bent the spokes down, the pre-stressing effect will be minimal.

If you have two professionals working in assembly line with one (me) building the wheels and the other (Eliseo) fine tuning and pre-stressing, you can be working on wheels at the same time. If you took five minutes per wheel instead of 4 minutes 48 seconds to build them, you could do 12 wheels per hour and complete 400 wheels 33.3 hours or about 11 hours per day for three days. We did in it three 12 to 14 hour days. OK, so I was sloughing off and taking my time. :-) You caught me.

Rim Travel

Before we get into the fine truing, let me share a little secret most mechanics don't know which will save tons of time and a lot of guesswork. Have you noticed that, when you are truing a wheel you will look at a space you need to move the rim to one side, then you will tighten and loosen the spokes to move the rim, then look to see how much you need to adjust the spokes to move it the rest of the way or maybe you moved it too far?

What you are doing is guessing at rim travel in relation to spoke adjustment. This causes all kinds of lost time and lots of extra work.

The owner and mechanics at MDR Bike Shop understood this and did some experiments to eliminate the guessing. They took some built wheels, placed them on the truing jig, loosened the spokes on one side while tightening the spokes on the other side, and then measured the rim travel.

They found that, if you tighten the spokes on one side one full turn and loosen the spokes on the other side one full turn, the rim will travel to the side where the spokes were tightened 1/8th inch (3 millimeters.)

This is very valuable information. If you see you have to move the rim to your right 1/16th inch (1.5 mm), you KNOW that you need to tighten the spokes on the right side of the wheel one half turn, loosen the spokes on the left side of the wheel one half turn, and the rim will move to the desired spot with no guessing. It just falls into place.

But, what if you need to move the rim 1/16th inch and the wheel is loose so you don't want to loosen any spokes because you are tightening the wheel?

Easy, just tighten the spokes on the right side one full turn and don't touch the spokes on the left side of the wheel. The rim will travel 1/16th inch to your right while you tighten the wheel. The inverse is also true. If the wheel is too tight and you don't want to tighten any spokes, just loosen the spokes on the left side one full turn without tightening the spokes on the right. The rim will move 1/16th inch to the right while loosening the wheel.

Maybe I want to tighten the wheel just a little while moving the rim. I tighten the spokes on the right side three quarters of a turn and loosen the spokes on the left side one quarter of a turn. It tightens the rim a little and moves the rim 1/16th inch to the right.

Neat, huh? This information alone and the trouble and time it will save you is worth the price of this book. At MDR, we considered bike building and maintenance a science.

Dishing The Wheel

Before fine truing the wheel, you need to check the dish of the wheel. This tells you if the rim is centered between the hub axel nuts and will fit between your brake pads. You do this with a dishing tool.

Different dishing tools work a little differently but basically you are measuring the dish or throw of the axel nut on one side to the throw of the axel nut on the other side. Half the difference between the two measurements is the amount you need to move the rim to one side to have it properly dished.

To dish the wheel, you will simply loosen the spokes on the side you want the rim to move away from and tighten the spokes on the side you want to rim to move towards. Now you can see the reason why you need to know the above information about rim travel. If you don't tighten and loosen the spokes equally around the wheel, you will throw the rim more out of true and even develop uneven dishing around the wheel.

Once the rim is dished, you can continue the wheel building process by proceeding to fine truing. But you should check your dish at least once or twice more while truing and again when you think you have finished truing before stressing the wheel.

Fine Truing And Tightening

There are also secrets and methods for the fine truing while finishing the tightening of the wheel. You will be working on the wheel in two basic ways. First, you have to take the "dip" out of the wheel. With this, you are basically making the wheel as round as reasonably possible while keeping the hub centered equal distance from the rim in all directions by decreasing the variation in the vertical movement of the rim while on the truing jig.

When you first start fine-tuning, you need to get this movement down to about one millimeter or less before attempting to remove the lateral movement or wobble from the wheel. If you try to remove the wobble before trying to remove the dip, you won't be able to get either straight and it will take much longer to true the wheel.

While you are truing the wheel, you will need to regularly check the spoke tension. The easy way to do this is by comparing the tension on the wheel you are building to the tension on a good wheel. You do this by squeezing two spokes towards each other in the top V of the wheel or the V closest to the rim. You will want to test the tension randomly around the wheel and not just in one spot.

After you get the dip to a reasonable level, then you start working on the wobble while watching the dip. When you get the wobble to less than one millimeter, then you must start working on fine-tuning both at the same time until the movement is negligible.

Some people will purchase expensive micrometers to get out dip and wobble you can't see but this is not necessary for a number of reasons. First, the structure of even the best tires is less perfect than any movement in the rim you can see with your eyes. If you get the rim dip or wobble down to a hair's breadth, the tire will dip and wobble more than the rim.

Second, the spokes will stretch with wear and change the movement of the rim far more than what you are getting out with a micrometer. So it doesn't make sense to true beyond a reasonable amount.

Pre-stressing the Wheel

Have you noticed that, when you first ride on a new pair of wheels, you hear a "sproing" sound as the spokes stretch and settle? That will bring your

wheels out of true very quickly and can be avoided by pre-stressing the wheels before riding on them.

To pre-stress the wheels, you go through a number of steps after the fine-tuning. First, you hold the wheel looking at one side with your hands on the rim at the three o'clock and nine o'clock positions. Place the hub axle on the ground on something soft like a rug or rubber work mat. You lean on the wheel with about half your body weight but not too hard or you will potato chip the wheel. You will hear the spokes sproing.

Turn the wheel in your hands 90 degrees and repeat the process. You do this twice on both sides of the wheel. Next, you hold the wheel by the axle ends placing the rim on the floor in its normal upright position like it is being ridden. You roll the wheel while leaning on it one full revolution back and forth several times or until the sproing sound stops.

Now you take the wheel back to the truing jig and remove any new dip or wobble until the wheel is once again fine-tuned. You repeat this entire process until the stressing of the wheel doesn't produce any more dip or wobble. When you first ride the wheel, you may only hear a few small sproing sounds but not enough to worry about. You should be able to race on this wheel instantly and not have to true it at all for months. The wheel is race ready.

Truing on the Bike

Often, professional race support mechanics have to true wheels without a jig by putting the wheel on the bike and using the brake blocks to measure dip and wobble. A really good and experienced mechanic can true a wheel on the bike well enough that you won't see any movement. You use the same truing methods as for truing on the jig but you use a thumb held against a brake pad to gauge the movement of the rim. As the rim gets more true, you simply move your thumb closer to the rim for finer truing.

A good race support mechanic can do an excellent job of truing a wheel on the bike and even checking dish with the tire on the wheel.

The Spoke Book

At the MDR Bike Shop, we found that the spoke lengths for different rims and hub combinations given in the books used by the bike shops were wrong most of the time. So we created our own spoke book by simply noting the size of spokes used to build a wheel with each make of rim and hub combination. We found this to be much more accurate and it saved us a lot of time and money.

You may need as many as three different sizes of spokes to build one set of wheels depending on the design of the hubs. Having the wrong size turns wheel building into a nightmare and is the most common problem faced by wheel builders. Therefore, I encourage all bike shops to create their own spoke book because the commercial books are so consistently wrong.

It takes a little extra time when you build a wheel with a new rim and hub combination to make the entry in your spoke book but will save much more time in tearing down and rebuilding wheels because the commercial book was wrong.

Our book listed the wheels by hub type and then, within the section for each hub type, we listed the spoke sizes for each rim type used with that hub. Our book was never wrong because the spoke sizes were always based on the results from successfully built wheels. I think the people who produce the commercial books either use a flawed math formula or don't build the wheels right when they develop their lists.

Another reason for creating your own book is that you will lose good customers by selling them the wrong size spokes. They won't like or respect

you much when they have to tear down a pair of wheels and swap for the right spokes they should have gotten the first time. If your customers know you keep your own custom spoke book, the word will get around that you are more dependable in selling the right size of spokes and you will get more business. We did. Keep your customers coming back.

A Few Significant Emergency Race Support Tricks

You will either be at a race or a big recreational ride when something goes wrong and the most important thing will suddenly be to just get the rider back in the race and to the finish as quickly as possible or just get yourself home.

Maybe, you will be at a race or on a bike trip and need to make repairs without spare parts. What do you do? You have to “make do.” In this section, I will cover a few of the more important and common items that may make a difference.

I should note to those of you who you treat your bike ever so gingerly as if it was a delicate piece of glass, you might find this a little course but this is the down-and-dirty way we treat our bikes at the races. You will find we treat our high performance racing machines the same way they treat their high performance racing machines at Indianapolis and NASCAR.

There is a joke among race support mechanics that, “You can’t be a great mechanic without a good hammer.” I have used a good hammer on more than one \$2,000+ pro bike. It works.

The Potato Chipped Wheel

At some point, every serious cyclist has to deal with a potato chipped wheel. This is when an accident with a good wheel or a broken spoke with a poorly built wheel or wheel that has too much spoke tension causes the rim to

collapse down on one side producing a wheel that is shaped like a potato chip.

In bike racing, we have a quick fix to get that rider back in the race as quickly as possible. You hold the wheel by the rim with the inner part of the curve to the potato chipped wheel facing away from you with the parts of the rim which are closest together at the top and bottom of the wheel.

You place the wheel on the ground with the wheel leaning away from you so you can force the bottom of the wheel against the ground. Then grab the wheel by the top part where it is collapsed down and place your knee or foot against the hub.

You should now be pushing against the hub forcing the bottom of the wheel against the ground and pulling back on the top of the wheel. You pull back hard enough to pull the wheel straight enough so it won't rub against the brake blocks. You are bending the wheel back in shape. You may have to repeat this several times to "true" the wheel enough the rider can continue in the race or you can get home. You may also have to release the brake quick release. As long as the rim misses the brake blocks, the wheel can be raced on or you should be able to get home.

Please note that, after the race, you are going to throw this rim and, possibly, the entire wheel away anyway.

Truing a Wheel Without Replacing The Spoke

You have just broken a spoke on the road or at a race and don't have a replacement spoke or have time to replace the spoke. Yet, you have to get the rider back in the race or you need to get home.

Just use the basics about wheel building and a little common sense. The problem is that you no longer have a spoke holding the rim true in one spot.

That broken spoke has released the rim permitting it to travel a lot in one direction. If you realize that the rim is being pulled in that direction by the spokes on the opposite side of the wheel, which are next to the broken spoke, then the solution becomes simple. Loosen the spokes on the opposite side of the wheel and next to the broken spoke until the rim will pass between the brake pads. This will get you back in the race or home.

Fixing a Flat Spot

In the above scenario about the broken spoke, after riding on the wheel, you will have a flat spot in the rim. This is relatively minor damage to the rim and you shouldn't have to replace the rim as long as you solve the problem quickly. You may also be on a road trip or a bike trip with no replacement rims handy and want to get the wheel fixed to where you don't feel a bounce every time that flat spot hits the road.

First, you get yourself a good wooden workbench or board without any nails or screws in it to protect your rim. Then you remove the tire from the rim and disconnect the two spokes on either side of the flat spot along with all the spokes in the flat spot. You put the wheel in the upright riding position on your piece of wood with you looking at the wheel from the side so that the rim is resting down on the wood with one side of the flat spot just touching the wood and the rest of the flat spot off of the wood.

Next, you get the mechanic's most valuable professional precision alignment tool, the rubber mallet, and beat on the inside of the rim towards the outside on the part of the flat spot which is just above the wood. What you are doing is beating the rim back out or beating it round from the inside out.

As you beat on the rim, roll the wheel slowly so that you will beat through the flat spot but always beating only on the rim that is just above the wood.

After you beat through the flat spot once or twice, check to see how much you have formed it back to round and see how much more precision alignment will be necessary.

When the rim is reasonably round again, you reinsert the spokes and true that part of the wheel. If you did a good job, you wont feel a thing when you ride.



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Part V • Chapter Seven

Gears & Chain

Gears And Chain

The bicycle drive train is a very important part of the bicycle but is commonly misunderstood. There are also a number of myths concerning its use and function. This chapter is designed to provide clarification about the drive train.

Deraillleurs

The deraillleurs serve two basic functions and it is a marvel that we humans took so long to invent them. The front derailleur just moves the chain from one chain ring to the other. That is it and nothing else. But you have to understand that it has to be adjusted and positioned properly to prevent problems.

For the vertical adjustment, the front derailleur needs to be positioned so that the outside plate to the cage is one to two millimeters above the largest chain ring when the outside plate of the derailleur is directly over that chain ring. For the rotational adjustment (around the seat tube) the outside plate should also be parallel with the large chain ring so that both will be in the same geometric plane when the derailleur plate is directly over the large chain ring.

On the front derailleur, you should have two stop screws (some deraillleurs only have one and are more difficult to adjust), which do exactly what their name implies. They simply stop the derailleur from moving further in one direction. The outside stop screw stops the derailleur from traveling to far to

the outside of the bicycle and causing the chain to be carried off the chain rings to the outside wedging between the crank arm and chain ring.

The inside stop screw stops the derailleur from traveling too far to the inside of the bike and causing the chain to drop inside the chain ring spider. (The spider is the part of the crank, on which the chain rings are bolted.)

It should be common sense that you adjust these screws to where they will permit the derailleur to move the chain from one chain ring to the other but not past that chain ring. This means that stop screw needs to be adjusted so that the derailleur will stop pushing on the chain when it carries to the other chain ring.

If these screws are adjust so that the derailleur won't carry the chain far enough, it will cause the chain to wedge between the chain rings. If the chain gets down to where its top is below the inner open spaces in the chain ring, you will have a lot of trouble pulling it back out.

It is also important to know that wedging the chain between the rings will warp the rings. You may be able to beat the rings back flat with a rubber mallet (the mechanic's professional precision alignment tool) and a piece of wood to beat on so you don't mar the chain ring. But, if they are too warped, you will have to replace them.

The rear derailleur performs two functions. First, it also moves the chain from one sprocket to another. Second, it takes up and gives out chain, which makes it possible for the chain to be moved from one size of sprocket to another without either bouncing off the sprockets or binding because of not having enough chain.

The rear derailleur also has two stop screws, which limit the lateral movement of the derailleur. The inside stop screw should be adjusted so that the derailleur will not dislodge the chain inside the freewheel and cause

it to become wedged between the spokes and freewheel. It also prevents the derailleur from carrying into the spokes destroying both the derailleur and rear wheel.

The outside stop screw should be adjusted so that the derailleur won't carry the chain past the outside sprocket causing the chain to wedge between the freewheel and frame.

It should be pointed out that the cage or body of the rear derailleur can become worn enough that it will move when you stand on the pedals torquing the chain and pulling against the derailleur. If you have your chain on the inside most rear sprocket and stand up, this movement in the cage can be enough to cause the derailleur to carry into the rear spokes destroying the derailleur and rear wheel.

You need to regularly check your derailleur cage to make sure it doesn't move much and occasionally watch it when you stand up to see if it moves much. It is better to replace a worn derailleur to save a rear wheel and a walk home.

When either placing a wheel in the rear stays or taking it out, you need to pull back on the derailleur cage so the wheel will easily come out or go in. If you have just put a wheel in your bike and start riding but find the rear derailleur won't move the chain, just check to see if the cage moved back into place when you released it. If it did not, just move it back forward with your hand and it will work fine.

You should regularly clean and apply a light oil to the hinges of both derailleurs to help them last longer and work better. You also have to know that the cable will stretch and you will need to readjust the tension. This is especially important with index shifting. With the standard friction shifting, you can make up for a little cable stretch by just moving the shifter a little.

With the index shifting, the shifter activates the derailleur at a give spot and cable stretch will cause the derailleur to travel either too far or not far enough. Therefore, index shifting requires more cable adjustments. It can tolerate much less cable stretch.

It is important to understand that the size of the “arm” with the wheels in the rear derailleur determines how much chain the derailleur can take up and give out or chain play. The longer the arm, the more chain play the derailleur will have. This is very important when you are using sprocket combinations with large differences in teeth.

If you are using chain rings with a large difference in teeth in combination with a freewheel with a large difference in teeth (considerably larger than normal), you will need a longer than normal arm for your rear derailleur to handle the extra chain play.

Chain Rings

The chain rings are the front sprockets on the bike. They pull the chain forward causing the rear sprockets and wheel to turn. The most important things you need to know about the chain rings are excessive wear and being warped.

A new chain ring will have a small groove in the top of the teeth with a symmetric space between the teeth. When the ring has become worn to where the tops of the teeth are just a sharp blade and the spaces between the teeth show a circular grooving caused by chain wear, you should consider replacing them.

Excessive grooving into the teeth will cause the chain to not fit with the rings and cause them to tend to slip. If the chain slips off your rings, you will probably be standing to attack or climb and will have a high probability of

striking your bars with your leg causing you to lose control and crash. No fun.

The chain rings, especially the larger one, can warp for several reasons. They can be warped by the chain lodging between them, by hitting the ground hard in a crash, and from just being ridden in a big gear for a long time. In the later case, the metal will fatigue causing the ring to slowly buckle to one side. In this case, they will need to be replaced because the metal is weak.

In the first two cases, rings that are not too old can be straightened out by beating them back into shape with a rubber mallet. Don't beat them back and forth or you will fatigue the metal weakening them, which will cause them to buckle prematurely. You can usually get away with straightening them out once or twice because aluminum weakens with bending.

Sprockets

The rear sprockets on the bike are referred to as the sprockets or freewheel. You need to be aware of two things with them. First, if the metal between the groove between the teeth and the inner part of the sprocket is too narrow, it increases the probability of the sprocket breaking under stress. One thing you want to listen for is when you hear that a certain size sprocket on a certain type of freewheel tends to break. If this happens to you, you will probably crash, if you are standing when it does break.

Second, you need to be aware of wear in the grooves between the teeth. If this space increases too much, the chain won't fit into the groove and it will either slip out at an increasing rate or skip. When this begins to happen, you need to replace the freewheel or sprocket with the chain.

It is important to understand that, if you are using freewheels, you need to replace the freewheel with the chain and vice versa because, if you ride

them together most of the time, they wear together. An old chain will not safely fit on a new freewheel and a new chain will not safely fit on an old freewheel.

With a cassette, you need to replace the worn sprockets with a worn chain. The sprockets not showing wear should be all right with a new chain.

The Chain

When you place a chain on your bike, position the pin you will be driving in to the link so that it is sticking out towards you with the opposite side of the chain against the outer stop for the chain tool. When you drive the pin in, you want to drive it in until it is sticking out as much on the side facing you as the pins on either side of it. This will compress the chain sides tightly together causing a tight link.

Then you must remove your chain tool, turn it around so that it will be driving the pin in the opposite direction and the plates on the side facing you are outside of the chain tool, and drive the pin towards you until the sides of the chain links move away from each other just enough that you can see a tiny space. This loosens the tight link. The side of the pin facing away from you should be sticking out as much as the links on either side of it.

If you don't do this last step, you will have a tight link in the chain where you put it together. This tight link will not track well through the derailleur and tend to skip on the freewheel sprockets.

Sometimes, a link will get tight from being banged causing the chain to skip on the sprockets. To solve this problem, just repeat the last step for installing the chain after looking to see which side of the pin you need to push in on. The side of the pin you will need to push in on will be sticking out the furthest.

When installing the chain, you need to make sure that it is the right length or fit. To do this, have the chain on the small chain ring and small sprocket. Check the amount of tension in the top of the chain between the chain ring and sprocket. If you don't know how much tension should be in the chain or anything else on the bike, cheat. Just compare the tension on your bike to the tension on another bike. It works.

Also look at the position of the rear derailleur arm when the chain is on the little sprockets. It should be in the same position on both bikes but an easy check is that the arm should be taking up almost the maximum chain play possible. It should not completely relax without providing tension on the chain.

Next, run the chain between the smallest sprocket and chain ring and the largest sprocket and chain ring. Except in the most extreme cases, the chain should not bind when trying to shift to the largest sprocket and largest chain ring

With wear, a chain will both stretch and loosen between the links. A combination of the two will cause a chain to easily stretch an inch or more in length over a period of time. When the chain stretches, it will not sit right on the sprockets and tend to skip and eventually just jump up and run over the sprocket. You will need to replace a chain about every 3,000 miles if you are racing and maybe a little less for recreational cyclists.

If you don't take care of your chain, your chain can't take care of you. You need to oil it regularly to clean off any dirt that has worked into it and keep it lubricated.

Some people got lazy in the 1980's and started using thicker oils so they wouldn't have to oil it as often. All they did was increase the fluid resistance on the chain and force the chain to pick up more dirt, which will work through the oil and begin wearing on the chain.

It is really best for you to oil your chain during off-season or for touring at least once every four to six weeks to clean the dirt off it. If you get sand, dirt, or mud in your chain, you should remove it, clean it in a solvent tank, and then oil it with light oil. You will find that a poorly oiled and maintained chain can slow you down by as much as two to three miles per hour because of increased resistance. A squeaky chain can slow you down by as much as five miles per hour.

One more concern you should have about your chain is forcing it to ride on sprockets in extreme opposites. This means that you are using the inside chain ring and outside sprockets or the outside chain ring and inside sprockets. This torques the chain so that the resistance between the links increases. This increased resistance will slow you down and increase the wear on the chain.

For example, with a five speed freewheel, you should never use the outside sprocket and inside chain ring or inside sprocket and outside chain ring. The more sprockets you have on the freewheel, the more sprockets you can't use in the extreme positions. With a seven speed freewheel, you should not use the inside chain ring and the two outside sprockets or the outside chain ring and two inside sprockets.

This means that with a five speed freewheel, you really only have about eight gears you should use and with a seven speed freewheel, you really only have about ten gears you should use.

Gear Use

You will often hear or read that you should slow down and shift gears before starting a climb because it is not possible to shift on the face of a climb. Oops, there is a little problem with this. The pros regularly change gears while climbing in the Alps. How do they do this?

You have to understand that the reason people tell you to change gears before you start the climb is because they don't know how to shift on the climb and have trouble getting the gears to shift. This is because the extra resistance against the chain while climbing forces the chain to remain on the sprocket it is on.

To over come this, you use a simple little trick I learned from a pro when I first started racing. You wait until you know you will have to change the gear in the next ten meters or you will lose a lot of speed. Then you lean on the pedals just a little to slightly increase your speed while moving your hand to the shifter.

Next, you ease up on the pedals just slightly so that the resistance on the chain is the same as it normally is on the flats while shifting the gear. You only have to soft pedal for a maximum of one full revolution to get the gear to change. If you do this right, when you have finished the shift, you will be back at the speed you were before you sped up to make the shift. You must practice this when training or you will most likely miss the shift when racing.

Using this method, you can carry your momentum up the climb instead of losing it all at the bottom when you slow to make the shift before the climb. This is a very important tactic because, if you carry your momentum on a climb and people chasing you slow to shift before the climb, you can easily gain several minutes on a climb of just a few miles. You can also use it to break away from a pack that slows to shift and still gain minutes on them.

Then there is the matter about how many gears you really need in a race. If you keep track of it for just a few races, you will find that, in the average criterium, you only use about two or three gears unless there is a strong wind or hairpin curve. Even then, you normally don't use more than about four or five gears and all those extra sprockets are just dead weight. The

only reason I can see for having two chain rings in a flat Criterium is for the quick shift I have explained in other chapters.

You will find that, even in road races, you normally don't use more than about four or five gears in a race. Here again, you will use a few more gears if the weather is bad but you will never use all the gears on today's 9 and 10 speed sprockets.

Even most recreational cyclists don't use that many gears except on the most difficult and varied terrain with the worst weather.

I don't remember a ride where I have used more than half my gears in 35 years and I have had some really fun mountain rides covering over 175 miles in one day. Think about it.



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Part V • Chapter Eight

The Criterium Bike

The Criterium Bike

In spite of the fact that the Criterium is the most common form of bicycle racing in the US, the great marketing geniuses have failed to capitalize on the design and sell of a bike which is specially designed for Criterium racing.

But anyone who has the money or sponsorship and is a Criterium and/or track specialist and races quite a few Criteriums every year should consider a custom designed Criterium bike. To help you, I will cover the basics for custom designing such a bike. The custom frame builders will love me after this chapter.

First we have to consider the performance demands for Criterium racing which are different from road racing. You will find that the bike has to be a blend between the track bike and the road bike because Criterium racing is the meeting ground between roadies and trackies. You might call Criterium racing a marriage between road and track racing.

The first and most obvious characteristic we must deal with is cornering. We want the bike to corner more quickly than a road bike while being able to pedal through almost all corners.

The single most significant key to fast cornering is to shorten the wheelbase because the shorter the wheelbase, the smaller the turning radius you will have. This means that you will either be able to take a corner faster with the same radius or take a tighter turn at the same speed. This is why shorter riders tend to corner faster than taller riders.

You do a number of things to a bike to shorten the wheelbase. First, you make the seat tube and head tube angles steeper. This brings the front wheel further back towards the rear wheel and permits more room to move the rear wheel forward by shortening the chain stays. Then you decrease the rake in the front fork to bring the front wheel a little further back still.

To increase your pedal clearance, you raise the bottom bracket just like on a track bike and use narrower pedals. If you have good leg speed, you can also shorten your crank arms to the standard track 165mm for an average size male. This will help keep your leg speed up for faster acceleration which you do a lot of in Criterium racing.

So far, this will give you basic track bike geometry and you can fly through the corners faster while pedaling when most riders have to coast. But it also gives you another advantage over the standard road bike in that your body weight is moved forward more over your pedals. This helps improve your attacking, sprinting, and jamming on flat ground but decreases your climbing strength for long climbs. It will be what you find in most Criteriums.

Now we have to deal with gearing. You will find that in most Criteriums, you will never use more than about 3 gears during the entire race. If it were not a tactical advantage to use the quick shift between your large and small chain rings, I would drop the inner chain ring and go with a five speed freewheel.

This could be overcome with some design of the rear gears and a lot of practice in rear sprocket shifting. Losing the front chain ring would save weight for acceleration but could cost you in a tactical situation. This is where it becomes a matter of choice and personal preference as far as individual riding styles.

Since you rarely use more than 3 gears in a Criterium, it doesn't make sense to have all that extra metal the big bike companies have sold you on with their 9 and 10 speed freewheels, I don't care how narrow and light they are. The more metal you have, the more weight you have to move from a lower speed to a higher speed when attacking or sprinting.

This is going to tell on your legs after about 50 to 100 corners even though you may not realize it plus it does slow your rate of acceleration ever so slightly. Since many Criteriums are won and lost by an inch or less, the extra weight of carrying those extra gears can make a difference between winning the sprint and losing it. Therefore, I personally would not want a Criterium bike with more than a five speed freewheel.

The only reason I would want a five speed freewheel would be for unexpected conditions such as wind or rain, which would cause the race speed to slow or increase on parts of the course. It would also help if there is a little hill on the course requiring the use of a 4th or, even, 5th gear.

Then I would want some form of handle bar shifters. Either bar-cons or brake-lever shifters. I have found being able to shift gears in corners without taking your hands off the bars to be a very valuable advantage in Criterium racing. It also permits you to shift easier and faster when in a mix with riders jumping and jamming. You have to be making the moves while changing gears. This is something that is very difficult and even dangerous to do with down tube shifters.

For wheels, I would want to use 32 spoke, three cross on the rear and 32 spoke two cross on the front. This will save weight and decrease wind resistance a little while keeping the wheels stiff and responsive. You also

need to maintain minimum wheel strength because not all courses have good surface quality.

I would not go with less than 28 spokes even for a small person because it really affects wheel true when you drop to 24 spokes or less. With a 28-spoke wheel or better, you can keep racing when a spoke breaks (unless you have the spokes too tight) by simply releasing the brake quick release.

When you drop to 24 spokes or less, one broken spoke causes the rim to move so much it will slam against the opposite brake pad putting you out of the race because you will still get significant rim rub even with the brake quick release open. This is where you have to think like a pro. The most important thing is for your bike to get you there. If it can't get you to the finish, then you can't win or place and your bike is trash or junk. Dependability is first.

I definitely would not use radially spoked, disc, or bladed wheels because they decrease your cornering and bike handling on turns and moves. Why slow yourself down or kill your upper body for a little extra speed on the straight. If you don't make the straight with everyone else, you are chasing anyway. Plus, if your upper body is tired from fighting your wheels through the corners, you won't have as good a sprint.

For tires, on most good courses, I would want a good 240-gram silk sewup inflated to about 120 pounds or more. I have found that 220's wear out much faster and are more prone to tire problems. I will accept the extra 20 grams to make sure I get there.

On courses that are not in great shape, I would tend to use a good road tire depending on quality of road surface. This would be anywhere from 260 grams to 290 grams.

That should cover at least the basics for a good Criterium bike. As you can see, it should have characteristics of both the road and track bike.

Good luck finding the five-speed freewheels. :-) Maybe, if there is enough demand, they will bring them back.



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Part V • Chapter Nine

Pre-Race Adjustments

Pre-Race Adjustments

I have found that a regular pre-race cleaning and adjustment of the bike is also a great mental preparation for a race. You will get to where cleaning the bike, the smell of oil, adjusting cables, and such will help psych you up for the race and give you added confidence in your equipment. 35 years after my first race, the smell of WD-40 still causes me to get psyched up.

The first and most important thing about pre-race adjustments is that you should do any mechanical adjustments at least three days before the race. This means that you have time to ride your bike after the adjustments and make sure that the adjustments were correct and, if not, correct them and still be able to ride the bike before the race to check the fix. The last cleaning of the bike can take place the day before the race.

Your adjustments should be made based on prior performances in equipment and a visual inspection. The first thing is to check all cables for frayed wires and cable tension. Frayed wires mean that the cable is getting ready to break and soft cable tension means that your cables have stretched and need to be adjusted. It is also a good idea to check them for rust and spray light oil like WD-40 in your cable housings for lubrication and to remove any possible rust.

Next, using a light oil which to remove rust, oil and clean the moving joints or hinges for your front and back derailleurs and brakes pivot bolts. Be careful not to get oil on your rims or brake pads. This removes any dirt or rust, causes the parts to move more freely, and protects the parts from

corrosion. This gives you an opportunity to see if the pivots or hinges have worn so that the units may need replacing. You do this by holding the derailleur or brake and trying to move it a little.

The rear derailleur is most important to check because, if it gets worn enough you can move the cage in a way that it is not supposed to move, then jumping on your pedals can cause the chain to move the derailleur just enough to cause the chain jump off the sprocket and cause you to lose drive or even crash, especially if you are standing up.

Note: Do not oil your friction shift levers for your gears. They operate based on friction and oil will remove that friction causing them to always give way to the cable tension shifting your gears for you. These need to be free of oil and grease at all times.

Next, you need to check all your bearings for tension. This includes your pedal bearings, bottom bracket bearings, headset bearings, and wheel bearings. To check your pedal bearings, simply hold the pedal in your hand and try to move the pedal as if you are trying to pry it out of the crank arm in a manner that the pedal is not supposed to move. If you get a little movement, it means that the pedal has loosened. You should check this even though it is not a very common problem.

To check the headset, you need to do two things. First, hold the front wheel off the ground and try to push the stem away from the saddle and pull it back towards the saddle several times. If you get a slight movement, it means the headset is a little loose. Then you turn the front wheel from side to side feeling for a roughness in the headset.

If you feel a roughness, you have knurled the headset and need to replace it before it gets too bad because this can cause speed wobble on down hills and cause you to crash. No fun.

To check the bottom bracket bearings, turn the cranks until one crank arm is at the bottom of the stroke and holding it with tension against the rear wheel, try to move the crank arm side to side. If it is loose, you need to tighten it.

Finally, to check the wheel bearings, lift the wheel being checked off the ground, grasp the rim and tire in your hand and try to move it side to side. If it moves a little, one of your cones is loose. If it moves a lot, you have probably broken an axle and need to replace it. This is another reason for doing your pre-race adjustments at least a few days before your race. It may take a day or two for you to get replacement items and install them.

Next, you want to check wheel true, spoke tension, and your brake pads for wear. You can check wheel true and your brake pads at the same time by spinning your wheel and watching it run between your brake pads. Lateral or vertical movement of the rim means a loose or broken spoke. To check for spoke tension, just squeeze pairs of spokes in your wheel. This will tell you which spokes are loose or broken.

You also need to check for sprocket and chain wear. Look at the teeth of the sprocket teeth to see if the chain is beginning to wear a groove into the teeth. A little wear is acceptable. Then tension of the chain will tell you how much the chain has stretched. It can stretch over an inch in length. Either of these will cause your chain to skip off the sprockets and can cause a crash.

If you are using a freewheel instead of a cassette, it is a good idea to replace the chain and freewheel at the same time because they wear together. Being

cheap and only replacing one will cause the chain to skip. If you are using a cassette, replace the sprockets, which show wear along with the chain.

Lubricating the chain is an important thing. A dry or rusty chain can cause you to lose anywhere from three to five miles per hour. A number of years ago, because of articles in cycling magazines, it became popular to use heavier bike oil that will stay on your chain longer so you don't have to oil it as often. When I tell people that I prefer using WD-40, they say, "But it evaporates and you have to oil the chain more often."

My reply to that is two things. First, heavy oil is more viscous and presents more resistance to the chain movement. Lighter oil gets more energy to the rear wheel and increases speed in a sport where races are won by inches. Second, the heavier oil and leaving it on the chain longer means the oil will pick up more dirt and the dirt will work its way through the oil to the chain causing more wear and resistance. I prefer oiling my chain weekly during racing season to clean it, remove any dirt, and keep it moving more freely. WD-40 lasts for at least 4 to 6 weeks, which is more than long enough.

Next, you want to check for tire damage. You don't want to go into a race with a tire that can give out on you during the race.

Once I bought some cheap tires that the sidewalls gave out on and became mushy causing me to think I had a busted rear axle. It changed my focus to one where I just rode the race for fun and quit to find that I had been sitting in a top five position chasing leaders in a road stage when I quit the stage race. I became upset the bike problem and quit paying attention to the race, losing track of my position in relation to the others.

Check all nuts and bolts including the seat post bolt. I don't know how many times I have seen saddles come off during races largely due to not having at

least couple of inches of the seat post in the seat tube. It is no fun during a race to hear any metal hit the ground, especially if it came from your bike or the bike in front of you.

Finally, clean your bike with soap and water. It is important to do this last after making adjustments and spraying oil all over the place. Watching that frame sparkle is a really great psych and great way to end the job.



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Part VI • Chapter One

Better Coaching

Better Coaching

There is a lot of confusion and misinformation about exactly what is coaching. What does it involve or require?

As a professionally trained and experienced coach, I want to answer that question for a number of reasons. First, it will serve as a guide for anyone wanting to start or improve his or her coaching career.

Second, it will help racers understand that, in spite of the fact that one or more coaches can no longer help you, there are still coaches out there who can help you. Then it will serve as a guide for athletes, clubs, teams, and sponsors in selecting a coach or determining his/her potentials.

What Coaching Is Not

A surprising number of exercise physiology and other sports science college professors believe in the simple-minded concept that exercise physiology (EP) is coaching and coaching is exercise physiology. More and more people outside of these colleges and programs are finally beginning to learn that this is not true.

EP is a very important tool that a good coach must have a good working knowledge of and will use on a regular basis. But it is not the only important tool that a good coach must use on a regular basis.

Over the last 35 years, I have seen a lot of young people come out of these college programs with masters and PhD's in EP believing this simple-minded idea. They have always beat upon their little chests, boasting, "I'll learn you boys how to coach", and then learn the hard way that they don't have the foggiest idea what coaching really is but they aren't one.

I have seen a lot of these people get embarrassed and even hurt people because they believed this simple-minded idea about coaching and tried to be a coach without being properly prepared. All of this is because we have too many college professors teaching things they only assume but don't really know much about. It sounds good to them so they teach it.

One such EP in So Cal with his little PhD recruited 23 of the 35 best women in So Cal. First, anyone can recruit 23 of the 35 best anything in a circuit and win races without being a coach. Any good team manager with a pocket full of money can do that.

But, the best coach can take nobodies and turn them into somebody's on the podium.

He boasted that he would learn us how to coach and then he put all 23 of his women in the hospital, did so much damage to their bodies that they will never be able to participate in competitive sports again, and was told by the court that he would not be prosecuted if he promised to never coach again. He learned us.

I knew a very good EP at the OTC in Colorado Springs that believed the same concept about EP being coaching when he first got out of college. He wanted to learn us how to coach and boasted about it. He challenged the national coaching staff to a coaching contest using the eight best individual pursuitists in the nation for team pursuing. He gave the coaches the four best and he took the next four to make his point even more clear. He

worked with his four athletes in his lab with all of his equipment for two years and took them to nationals to learn us all how to coach.

I realize that not all of you know that there are not that many really good pursuit teams in the US. At that time, there might have been three or four good pursuit teams in the US, at best. There are not that many athletes who really work on team pursuing. Therefore, the absolute worst he should have done at Nationals was second or third.

His team got seventh. They got spanked and he learned us.... that EP is not coaching and coaching is not JUST EP.

I even had a person tell me that he could be a coach because he read a book on EP. I cannot believe what some people believe. Could this person even comprehend the number of books, lectures, and other material I had to go through to learn how to coach? And the real education starts in the field with learning how to use all of that knowledge.

Theory sounds great but practical application gets the job done.

Then there is the myth among some intellectuals that coaching is for dummies. They believe that coaching is a manual labor type of job that doesn't require any intelligence. But let's analyze that and see what coaches really do:

We gather information, analyze information, and make decisions based on the analysis of that information. We call that thinking, you know, like CEO's, scientists, and other intelligent people do. So, a coach's primary job is thinking.

People are beginning to learn that the more intelligent coaches tend to rise to the top. I believe that coaching in the 21st Century will become more recognized as an intellectual profession. To be competitive, you will have to

cumulate a vast supply of intellectual tools. We call that learning. The more of these intellectual tools you have, the better your chances of success.

Some people like to argue that there are very good coaches who do not have that much of an education as a justification against learning more.

Their argument is true but grossly ignorant because, if you take the same individual with and without the additional intellectual tools, the one with the additional tools will be the better coach. My point is that any coach can make themselves better coaches by learning. No matter how well my program did, I always listened to other coaches to see if I could learn more to be a better coach. Why would I not want to improve my chances of winning?

The Modern Coach

It is only a matter of time until being a retired jock and coaching based entirely on your personal experience will no longer be adequate for success.

More and more jocks are obtaining better training for coaching and making it more difficult to beat them. What training does a coach need? Surprisingly, you can obtain most it locally and don't have to travel to the OTC for coaching programs.

You can actually get better training for coaching in most local colleges without enrolling into a coaching program. I will show you the courses you need to take and what to get from them. I will list these below.

You can even take most of these courses during your off season and you can take them audit so you can improve your knowledge without having to worry about a grade. You can also find colleges, which offer these courses via correspondence. Be careful with these and make sure the college is accredited.

The only real reason for most people to go to the OTC is to get cycling specific knowledge and ideas. You can also get that from a number of books including this book and learn from the comfort of your home. It is a nice experience to go to the OTC, if you can afford it.

For those of you who can't afford the time or money or you just want to coach weekends for fun, don't worry, I will teach you enough in this book to be reasonably successful with that. Don't let the following scare you off from helping others.

Science Courses

General Science

There are any number of basic science and even engineering courses that will help you. In my coaching, I have used my studies in engineering (I started college in engineering), physics, chemistry, biology, and human anatomy.

The engineering and physics are obvious for helping you deal with the mechanics of the bicycle and aerodynamics. A major mistake engineers and physicists make in studying the function of the bicycle is that they forget to include the human being as a functioning part of the bicycle. This requires understanding the science of Kinesiology or biomechanics. These people have come up with some unreal ideas for modifying the bicycle over the last few decades.

Chemistry and biology are very helpful in understanding the function of the human body at the molecular level. Human anatomy is important for understanding the structure and mechanical function of the body. These are also prerequisites for some of the following biology courses.

Exercise Physiology

Sounds foreboding, doesn't it? It isn't. All you are doing is studying the function of the human body in relation to rest and exercise. Most people can learn it.

If you can't find a good course in EP, a course in regular physiology beats learning nothing. It is a very valuable tool and I used it a lot. I used it to improve on the standard training program and provide my riders with a better program.

It was also very handy for understanding medicine when dealing with doctors for my family and myself. Most doctors appreciated me having the knowledge. EP is fun and very valuable tool but not the only major tool you will need.

Kinesiology or Biomechanics

This is a very important tool that I have used a lot. In a nutshell, it is using human anatomy and physics to understand the mechanical function of the human body.

This science is important in all sports but, especially in cycling because of the complex physical interaction between machine and man/woman. This has been a very valuable tool that I have used in developing riding techniques and discipline, understanding the differences between people of different ages, sexes, and sizes, and developing special riding techniques to improve the efficient use of energy and for recovery while riding. I'll teach you most of the stuff I have developed with this book.

Tests And Measurements

This course teaches you how to design tests for such things as strength and flexibility. It teaches you how to know exactly what a test does and does not evaluate. This is an excellent tool I used to evaluate my athlete's fitness

levels, strengths and weaknesses, and to evaluate a race for tactical purposes and the fitness programs required to prepare for that race.

After all, a race is a form of test and knowing which fitness characteristics a race "evaluates" is very important to a good coach. I had specific races in So Cal that I used to tell me specific things about my riders' training programs. You would be amazed at how many riders will tell you they are doing something when they really are not.

A good example is the Manhattan Beach Grand Prix. It is great for telling you which of your riders have been doing their interval and acceleration work because there are two 180 degree turns every lap. The ones who had not been doing their interval training found themselves standing beside me after about five to ten laps.

I had a saying that you can't hide from the coach. I will find out how you train because your body can only do what you train it to do. I'll put you into several different races based on the fitness requirements for those races and your body will tell me exactly how you train. It works.

Athletic Training

Athletic training is basically the fundamentals of sports medicine. A good athletic trainer (AT) will know more about sports medicine than most doctors who hang up the sports medicine shingle.

I really used this science a lot in developing my training programs and warm-up programs to help prevent injury to the athletes. Because of this science, in the five years I coached the LART, I never had one training related injury. That is very unusual.

I also used AT to help athletes recover from injuries, illnesses, and overtraining. There were doctors, especially orthopedic doctors, who

consulted with me on helping athletes recover from injuries or surgery once they found out that I knew this science.

Sports Psychology

This is one of the single most valuable tools I used in coaching. The way you think will determine how you train and compete. How you train and compete will determine your success. This is the single biggest mistake EP's make in assuming that they are coaches. They approach the athlete as a biological machine.

It is a human with a mind that must first be dealt with.

I learned a long time ago that, if we had a machine which could replicate a human being to where we could make an exact replica of a person down to the atom and we could replicate an athletes body nine times and put ten different heads on those bodies, in two years or less, we would have ten very different athletes as far as abilities.

If we replicated one person's head and put it on ten different bodies, their athletic abilities would be surprisingly similar within two years or less. It is the human mind that drives the body and makes it do what it does. What the body does is what determines how it will develop. How you think is the single most important aspect of sports. It makes you, you.

I have told you about the races we won and the many placings we took but my most prized trophies are the people who were a little better off as people because I coached them and taught them to think differently about themselves. I proved to them that even they could be winners.

Did I tell you about the teenager who was so much trouble that his parents and teachers were convinced there was no help for him and he would be

either dead or in prison by the time he was 21? The last I heard, he was a very nice person married to a nice Belgian girl and racing bicycles in Europe.

How about the introverted pudgy little black boy from south central LA who's single mother brought him to me because he was hanging with gang bangers. He was in such terrible shape that even after six weeks of training he got lapped after only two laps in his first Criterium on a three quarter mile course.

Some people told me I was wasting my time because he wouldn't last two weeks. I told them that, if he lasted two weeks, he would get two weeks worth of coaching and I didn't want to hear any more about it. One and a half years later, the lean mean racing machine was the best Junior in So Cal and won three different Criteriums in one two day weekend.

The last I heard, he wasn't in jail, he wasn't lying dead in the streets in his own blood, and he wasn't a junkie. He was a junior in college.

Or how about a very introverted super geek who would have been the last selection for any high school sports team in the nation? He was the only rider on my team that stayed with the program for three years and wasn't consistently placing in the top six as at least a Cat 3. After three years, he didn't have one placing. He didn't quit, so I didn't quit.

Other people thought he was a waste of my time and told me so. To some, he was a joke until his fourth year. He won three races and took six top six placings. When I left LA, he was doing the absolute worst job for an extreme introvert; he was a salesman. That is coaching.

These are my most prized trophies and sports psychology is the single most valuable tool you must learn to use. You have to help people change the way they think. You have to think like a champion to become a champion. The best you can be is the best that you believe you can be. It works.

Coaching Courses

Principles or Fundamentals Courses

These are really great courses. I took three of these courses. They teach you two very important things.

The first is how to custom design a training program for an athlete based on their current fitness level and characteristics and their short and long-term goals. The value here should be obvious.... even to an EP. :-)

The second thing this course teaches is how to custom design and modify (great for program growth) a program to meet the needs of the athletes and goals of the team.

It teaches how to custom design training events for proper fitness develop. These courses are great for both team and farm programs. I used this stuff a lot. I am trained to design, manage, and improve any sports program including college, professional, and national programs. This was one of my most used and valuable tools. See my chapter on Farm Programs.

Youth Coaching

I spent an entire semester class learning how to coach young people from ages six to 18. We studied their changing physiology, psychology, sociology, parents, and more.

It was great and I used it a lot for my Junior team. BUT, I also used this course a lot in learning to understand the differences between coaching men and women and the different ages such a masters. This helped me to better understand coaching pregnant women because of the growing young person inside of her and its molecular growth requirements. This is a very important tool for those of you who want to coach Juniors.

Athletic Administration and Sports Organization

This covers the business end of sports programs. It is very valuable for larger programs. It is basically how to manage programs for high strung and ambitious humans we call athletes. We were even trained in sports facilities design and management and how to coordinate different types of sports programs to maximize the efficient use of a facility. Boy, would I like to get my hands on a Velodrome. :-)

Coaching Other Sports

Most people understand that there are cross training benefits for athletes but don't know that there are also cross training benefits for coaches.

You would be amazed at how much has been developed in other sports that we can use or modify and use in cycling. Why reinvent the wheel when someone in another sport has already done it? Learn from other sports.

I have been trained in at least the fundamentals of coaching, managing, promoting, officiating, and participating in 15 to 20 different sports and sports disciplines. I feel that every professional coach should learn to coach at least two to three different sports.

Sport Specific Coaching

These are programs where you learn about a specific sport that you want to coach. They get much more into detail on a specific sport. You can get these programs from the governing body, books, and special clinics. I have heard that there are now colleges that offer courses on coaching bicycle racing but as I write this chapter, I haven't heard which ones offer these courses. They could help you learn more about the sport very quickly.

Experience

This is a very valuable tool because you learn what works and when to use it. Success is the culmination of education and experience. You just jump in and start learning.

I went to California to do my coaching because it was the hottest and fastest racing circuit in the nation. My strategy for showing my ability as a coach was to jump into the biggest lake with the biggest fish and start swimming. If you made it to the top, you were good. It works.

In a nutshell, that is coaching. Well, do you still think that EP is coaching and coaching is just EP? I hope not. I hope you have a better understanding of coaching, what you will need to be a coach, and what to look for in a coach pending your goals and fitness and experience level.

Unfortunately, in bicycle racing, professionally trained coaches are few and far between. That is one of the reasons for this book; to make more of this information available to more riders, coaches, and team managers.

Stick with me, I'll get you there.



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Part VI • Chapter Two

The Farm Program

The Farm Program

For over 30 years, there have been two basic camps in the debate about how to best promote bicycle racing. There have been the grass roots proponents and the national to international programs proponents. The truth is that a properly designed farm program must have three basic elements.

These are the feeder system, the developmental program, and the teams program.

If you don't have all three elements and have them properly balanced, you are limiting the potential of your farm program. I will discuss each part of the system and then the coordination needed between the parts. I will also show that your program works best with a coach but can still be done with reasonable effectiveness without a coach. Many of these ideas can be used to promote recreational cycling.

Feeder System

The feeder system is the program you design and use to feed new talent into your program. Most of the grass roots and teams program proponents have neglected this crucial system.

Most of the people involved in grass roots programs such as Junior or beginner programs and the teams programs think of a feeder system as recruiting the best riders they can find from other teams. This does not bring

new talent into the sport. As people are beginning to learn, we don't just need to bring new talent into our own programs, but also into the sport. Besides, ignoring the issue of bringing in new beginner talent is ignoring the issue of future talent. To keep the sport growing and developing, we must recruit and meet the needs of beginners. But we also need the team programs to help us do this.

Our first step in developing a good feeder system is Marketing and PR. We must let people know that we are out there, we are actively recruiting beginners, and we have programs to meet the needs of those beginners.

At the Los Angeles Racing Team, we used a number of different tasks to achieve this. First, we placed free ads in any publication that offered free ads for non-profit corporations specifically stating that we were recruiting nothing but beginners. We also used every opportunity to get articles in local publications, on TV, and interviews on radio about our beginner program.

This created the image in the minds of local sports and cycling enthusiasts that we really cared about helping the beginning athlete learn and improve within our program. This made us a concerned and very different program.

We started with eight members in January 1986 and, when I left the program in September 1990, we had over 120 riders on nine different road teams and in track and mountain bike racing. With over 120 racing programs in Southern California, people would still commute as far as 90 miles one way for my weekly lectures and clinics.

We had riders coming into our program from other programs for the coaching. Some moved from as far away as Texas and one father flew from Dallas, TX and back just to hand deliver his son's resume to get him in our program. It works.

Other programs that can help bring new racing talent into the sport involve working with the recreational cycling community. It involves back scratching between the two communities.

Your team coach(s) and pro racers can give a monthly lecture to local recreational clubs about such things as training, diet, and riding techniques. The recreational cyclists get information that adds value to their cycling enjoyment and you will get new racers.

When you consider that there are over 100,000,000 cyclists in the US and we don't have 50,000 licensed racers, we have really missed the boat on this one. When you look at other sports such as running, you realize that, by the most conservative estimate, at least one percent of the recreational cyclists in the US should be licensed racers. That would give us 1,000,000 licensed racers, which is a very strong political group. We don't even come close.

Another program we can use is to have our pro racers and coaches give bicycle safety clinics with demo's about bicycle racing at our public schools. This gives us an image of caring about the youth of America and provides a positive exposure for our sport to people at the most impressionable age.

Imagine how you would have felt if a pro football or basketball player or coach had come to your school and lectured on sports safety and about their sport. It would have been a thrill to raise your hand and ask just one question. But even amateurs can have an impression on these kids. This also helps develop good relations with your local police and will help get more money from your sponsors by getting more favorable press for your team. You get out of your program what you put into it.

The Developmental Program

All of this sounds really great but, if you don't have a properly designed development program to back it, they will come to your program a few times and then go to another program or sport.

Most developmental programs in the US are very primitive. They usually involve having an experienced rider ride with a group of riders from one or more categories. If they happen to see a rider do something wrong, they will talk to that rider about it. At most, the experienced rider will talk to the other riders a few minutes before or after the ride.

A properly designed developmental program will have weekly lectures, riding clinics, and coaching at the races and on rides. If you don't have a coach, have your more experienced riders take turns giving the lectures.

Weekly Lectures

But, Coach Carl, there isn't that much to talk about to have a weekly lecture!! Garbage! Our one hour, weekly lectures had a structure which varied pending the time of year.

We started with a roll call which provided me with a written record of who made the lectures and who didn't. It also helped me learn the names of new riders because I am terrible with people's names.

Next, the roll call exposed new riders to team members who I encouraged to introduce themselves to after the meeting and it made it possible for new members to learn the names of the members very quickly. The roll call alone made our team a family and new members became a part of that family much faster. The roll call only takes a few minutes.

Next, my team manager would spend about ten minutes going over team business. With this being done on a weekly basis, it made everyone else more of a part of the team management and provided my team manager with more assistance. We would also cover any travel or race logistics for the next weekend's events, if necessary.

This left me with anywhere from 30 to 50 minutes for lecture or other business.

As a coach, lectures during the racing season were very easy. Most of the time, I didn't even have time to do much if any structured lecturing about general material. We would start with discussing that weekend's race results and a little back patting for everyone who helped win the race including domestiques.

I almost always would follow this by discussing things that we needed to work on and other tactics that could have been used. I encouraged asking questions and taught that the only dumb question was the one that didn't get asked.

This material alone was almost always enough for a full lecture during the season. But I still came prepared to do a full lecture. After all, what I did not cover this week I could cover next week. This is a very important philosophy. Always go to the lecture with more notes than you think you will need and cover the topic in detail. Don't rush through a topic and cover it poorly to "get it done." Cover it properly even if it takes two or more lectures.

Immediately before and after the season, I would spend about one month going over on season and off-season training. I handed out generic off-season training calendars based on fitness level.

The only time you could possibly run short on lecture material would be during the off-season. In So Cal, that was from the middle of October (I had my riders shut down and go into off season earlier than the other So Cal teams) to the middle of February. That is only four months or about 17 weeks. As I stated above, part of that was used for the transitions between seasons.

But, even at 17 weeks, outline everything that is in this book (feel free to do so for your lectures, especially if you are having trouble coming up with material) and try to properly teach it in 17 lectures of only about 30 to 45 minutes. You can't do it. Plus you will want to take off two weeks during the Christmas vacation because no one is going to show up anyway. So now we are down to less than 15 full lectures during the off-season.

On top of all of this, I had my "for-fun" lectures. I would do a race analysis of the Tour de France about 3 to 4 weeks prior to the Tour. I got my racers involved and used the Tour as a teaching tool.

We had a contest for the racers. Every rider had to submit their guess on who the top five places would be in the Tour for that year and they had to be in order. Any fool can accidentally guess who is going to win the Tour, but to guess the top five places in order means you have to think the sport through and will learn more about race strategy.

The best any of my riders ever got was two out of the top five and the best I ever got was four all in order. It's fun and gets everyone involved in the weekly lectures. Plus, I also showed videos about the Tour and other races

as teaching tools. It is really great when you can show your riders pros that are doing what you teach them to do and they learn more.

And you thought there wasn't enough to do for 50 lectures a year? On top of all of this, you will have to provide different lectures for riders with different experience and fitness levels. I ran three lectures per week for beginning, intermediate, and advanced racers.

Riding Clinics

In my chapter for Riding Discipline, I cover the material for the riding clinics in more detail. What you need to know here is that, like all other sports, there are motor skills involved in cycling and, if you don't practice those motor skills on a weekly basis, they will not be properly developed or will decline. You must have weekly skills clinics for even your best pros if you want to maximize their winning potential.

Coaching

As I mentioned earlier, you can have a reasonably effective farm program without a coach, but having a coach, especially a professionally trained coach, will greatly enhance your program.

If for no other reason, having a coach provides your racers with objective feedback on their racing. We humans like to believe we did or do better than we really do. Therefore, it helps us keep our feet on the ground and us in touch with reality if we have someone else tell us how well we really did. We may not like to hear it, but it is good medicine.

The better the training the coach has, the better the job any coach will do. Education is the organized and structured gathering and dissemination of

knowledge. Knowledge is a tool we use to create, build, and succeed. The more knowledge we have, the more tools we have. The more tools we have, the more we can create and build, and the more likely we are to be successful. When facing any job or task in life, ignorance is an empty toolbox. See my chapter on coaching.

But, Coach Carl, we can't find or afford to hire a professionally trained coach to start or manage our farm program. Then you do the best you can with what you have. That is also one reason for this book, to help those who don't have the training to do a better job. That is why I am here, to help you. I realize that most of you don't have the training and experience that I have. I can help more people with this book than I can help by spending the same time working with one program of my own.

The Teams Program

The teams program is a very important part of any farm program. Without a teams program, what are you training riders up for? Your beginning riders will have to have a purpose and a goal to keep them in the sport. Nobody likes to train for the sake of training. They will want to make the team. This is the really big thing that the grass-roots-only people miss out on.

But a good teams program offers much more than that. With the Los Angeles Racing Team, I integrated my teams program into my farm program. My top riders were REQUIRED to help me train up our future talent.

OK you coaches in the LA area who used to stand just close enough to me at the races so you could hear me talking to my riders hoping you could hear my secrets. This is the single biggest secret I used for my program to be as successful as it was. How did ONE coach so effectively coach over 120

athletes on nine teams at one time? Every coach in the world will tell you that no coach can effectively coach more than 20 to 30 athletes at one time.

It is so simple you are going to hate yourselves for not thinking of it. It is all built around the concept that, if I teach you something, you can turn around and teach that something to someone else.

I used my racers as an extension of my own coaching. I had 120 assistant coaches in my program because of the way I organized and managed my program. I had the biggest coaching staff in the United States and possibly the world. That's right, my single biggest secret for my success had nothing to do with exercise physiology. It was all sports organization, athletic administration, and sports psychology. This is how I did it.

First, you have to motivate your racers to be part of the program by showing them how they will benefit from the program. And they stand to get a lot out of it. You must understand the concept that, if you really want to learn something, teach it.

Learning something from someone else is good, but the first time someone else asks you a question about that something, you are going to have to think it through, learn why, and then explain how and why. You WILL learn it. I taught my racers this, they understood it, and were very willing to use this technique to improve their cycling.

Next, I taught my racers that the better trained the new riders are when they get strong enough to ride for you, the better domestiques you will have and the more consistently you will win. It works big time. They also learned that people you help from the time they begin the sport, automatically develop a loyalty to you that pays big dividends later on.

Because of my experienced racers giving back to the sport by helping train up the beginners, we had the most loyal domestics and most tightly knit team I have ever seen in cycling. We were a family, not a team. It was nothing unusual for riders from other teams to find me after a race and complement me on how incredibly tight my team was.

The biggest mistake I ever made was in the last year of the program when I let my sponsor and team manager pressure me into hiring three riders for my Men's team. It was devastating to my team loyalty and we would have done even better in 1990 if I had kept the team the same as it had been in 1989. My Men's team won more races in 1989 than it did in 1990.

Fortunately, I didn't hire anyone for my Women's, Juniors, or Masters teams. Except for the riders who came to my program for the coaching, they were all trained up from within my program.

Loyalty from your riders starts with loyalty to your riders.

Also, because of my program and my experienced riders helping the beginners from day one, we had the lowest turn over or loss of beginning riders I have ever seen in cycling.

It has been stated in the press on numerous occasions over last 30 years that the attrition rate for new racers is that better than 90% of beginning riders would quit within the first year. Conservatively, my attrition rate was less than 50% because we proved to them that we cared about them. A good farm program really helps promote the sport.

Startup

So, how do you start such a program? It is surprisingly simple.

Get a group of people together who want to create a farm program. Organize a club with a basic staff structure of president, vice president, treasure, and secretary. You designate a coach or team manager to be in charge of developing such a program. Do the PR and marketing work to go out and get people. So, the feeder program has to be first but you have to already have a basic plan for your developmental program for when the first beginners show up.

You toss your beginners into your developmental program and when they get good enough to work as teams, you start developing loosely organized teams. With time and hard work, you develop the upper level teams and use them to promote the lower level of your farm program. It works.



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Part VI • Chapter Three

Walk On's

Walk On's

I want to use this chapter to discuss a myth in sports. Most people tend to think that the best potential professional athlete is the person who was the greatest amateur athlete. We studied this in college and it was surprising that they had found out that this is not always true. There is a thing we used to call the Walk-on Phenomenon.

You will find that there are three basic athlete personalities that have to do with amateur and pro sports. The personality that most people believe is the norm really is not that normal. It is the attitude where as an amateur; the person is committed to a hard work ethic, believes in himself or herself, improves, and can do the same in pro sports.

But the more normal personality among very good amateur athletes is that they believe they can do well as an amateur but are not so confident in their abilities as a pro. This is because they tend to see amateur sports as semi recreational activities, which are just for fun. Because of this, they feel no stress in amateur sports and perform very well. But the same person often sees pro sports as a more major commitment and tends to get stressed out. They fail to handle the stress and perform poorly as a pro often dropping out of the sport with a dismal career.

Part of this phenomenon is caused by the very high expectations of others when the expectations were not as high or serious when they were amateurs. A large part of this phenomenon is caused by their perspective on amateur and pro sports.

They tend to see amateur sports as being "no big deal" because it is "just a game." Whereas they tend to see professional sports as being much more serious because it is seen by them and others as more than just a game. Because of this, they tend to subject themselves to too much stress, which destroys their career potential. Over the last 100+ years, many great amateurs have gone this way.

The opposite personality has caused poor to mediocre amateur athletes to become hall of fame professionals. What we found out about these people is that, because they also see amateur sports as "no big deal because it is just a game", they don't see any reason or have the motivation to achieve or push themselves. After all, it is just a game and they are in it just for the fun of it so why bother. This causes them to have a very lackluster amateur career.

They also see pro sports as being much more than just a game but they react differently to turning pro. They have no doubt about their ability to do what others can do in spite of not having done well as an amateur athlete. This is because their performance as an amateur had nothing to do with confidence and ability. It was all attitude. When these athletes turn pro, they become more serious, and their attitude towards achieving in the sport changes. They suddenly apply themselves and become champions.

Every sports hall of fame has plenty of super stars that belong in this category. There are so many people who respond to sports in this way that most professional sports organizations still permit walk-ons for the tryouts. It is not unusual for these walk-ons to bump drafted athletes in the pro ranks that they couldn't even compete against in the amateur ranks because of this phenomenon.

The walk-on phenomenon is one reason why I believe that even a good cat 3 should be permitted to turn pro and not just cat 1's. There are plenty of

good cat 3's who cannot break through to the cat 2 level as an amateur because of either psychology or finances. By permitting them to turn pro, we also permit them to change their psychology and finances in a way that provides them a better opportunity to succeed as a professional.

I believe we should structure our pro racing so that a cat 1 turning pro gets a cat 2 pro license as is presently the case, a cat 2 turning pro gets a cat 3 pro license, and a cat 3 turning pro gets a cat 4 pro license. This is similar to what is common in European pro racing and permits both minor and major league pro racing in the US. This would also mean that we need to keep the cost of a pro license as low as possible to help the low income pro be able to race without another financial burden.

We need to get away from the attitude that the best pro sports in the US have proved to be obsolete that, "Only the best amateurs should be permitted to turn pro." These sports proved decades ago that ANY good amateur should be permitted to turn pro. In cycling, that would mean a good cat 3 or better.

When compared to the best pro sports in the US, from the perspective of athletic administration, sports organization, and sports development, cycling is still thinking and functioning in the dark ages. We need to move cycling into the 21st Century and learn to work for our athletes and not against them.

The walk-on phenomenon is a very important aspect of professional sports to understand when designing and managing professional sports. This is especially true in cycling. If the other pro sports had not permitted the walk-on, they would have denied their sports the opportunity to experience some really great super stars and performances, which have often contributed to the growth and development of the sport.

In cycling, we don't have preseason try outs like in football, baseball, and basketball where a walk-on can show his stuff after turning pro. The only way he can "try out" for a pro team is to ride the actual races as an individual or on a small pro team. Since the UCI has decided that they no longer want individual riders or smaller teams in their sanctioned events, they are shutting out the walk-on and denying the sport future super stars and Tour de France winners.

Because of this, minor league pro racing is a must for the development and growth of cycling. We need regional pro circuits, which limit the maximum size of a pro team, do not limit the minimum size of a pro team, and ALWAYS permit the individual rider to participate in races.

This has become the only way for the walk-on to have a chance to show his wares and make a major league pro team because he will not do it as an amateur.

The question we must ask ourselves is, "How many super stars and Tour de France winners will we deny ourselves because we refuse to properly structure our sport with minor league pro circuits spread out across the US?"



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Part VI • Chapter Four

Local Road Program

Local Road Program

In this chapter, I want to offer suggestions for the design, organization, and management of a local road-racing program.

First, when I began racing in 1968, the Amateur Bicycle League of America (today's USCF) believed and told every one that the best way to promote bicycle racing in the US was with track and Criterium racing. Being new to the sport, I just assumed that they had done their marketing research and knew what they were talking about.

Over the next year, I began to see a lot of signs from the non-cycling public, which conflicted with this belief. So I contacted the ABL of A and asked if they could send me the marketing research they had done on the promotion of cycling in the US so I could use the information to promote local cycling. By this time, I was not very surprised to find out that not one person had done that marketing research.

What I found out was that the majority of the ABL officials were former track and Criterium racers who believed that track and Criterium racing were the best way to promote cycling in the US because these were their favorite disciplines in the sport, and they were biased towards their disciplines. In other words, they were transferring their preference for the sport onto everyone else.

But it gets better. Over the years, I have talked to almost all of the major sports promotion firms and television sports departments that make a living

promoting and selling sports. To my absolute amazement, there has not been one such "professional" program that has acted in a professional manner by doing such marketing research either. All they are doing is guessing and speculating at what THEY think the people are most interested in seeing.

In the summer of 1969, I had already had enough training in testing, evaluation, and lab work protocol to know that the only way to really know what people want in a sport is to ask them. I also knew how to ask them. The best way to find out what people think is to verbally ask them one-on-one. This is because the researcher can start with a standard set of questions and alter the questioning if he finds additional or different information of interest or value. The trouble is that this method is very time consuming and expensive.

The standard way of doing such research is to design a series of questions for a written questionnaire, have people fill it out, and analyze the information hoping that your questionnaire didn't leave out any valuable information. But, for a poor kid working his way through college, this is too expensive because it requires printing, mailing, and other expenses. Being low on cash and high on time, my time was my best asset and the least expensive way for me to do the research.

In the summer of 1969, I put together a set of basic questions and started out to find out what people really want to see in a sport. What do they find interesting and why?

At every opportunity, I would spend half an hour to over an hour with one person asking that person what he/she found interesting about cycling and sports in general. These were all people from the non-cycling community who enjoy watching sports of any type. I spent the next ten years doing this research on a regular basis and learned a lot. I have regularly done spot

checks since then and still do them today to see if there have been any changes in people's attitudes and enjoyment of sports.

A second part of this research was aimed at the athlete and his/her preference for events. I asked all of my athletes and many others why they came into the sport and what they wanted from it along with many other questions.

Therefore, unlike all of the self-acclaimed experts in sports promotion, when I tell you that people want something from sports, I am not guessing or speculating with all my brilliance. I am simply telling you what the people told me they want because, unlike all the experts, I asked the people what they want.

A few years ago, I called around and asked all the major sports promotion, sports marketing, and television sports organizations including ABC Sports, CBS Sports, and NBC Sports if any one had done such research to really find out what people want in sports and, to my amazement, NOT ONE of these "professional" organizations has done this research or even knows of anyone who has. Therefore, I am the only person I have been able to find anywhere who has done this research and could really even come close to knowing what people really want in a sport, whether spectator or athlete.

I want to share the basic parts of this information with you to help you better understand sports promotion and promote the sport of cycling. Remember, I am not guessing, I am telling you what thousands of people have told me over the last 35 years.

Add to all this training and experiences in athletic administration, sports organization, and events promotion, and I have a lot to offer you that can help you help the sport we both love. I hope you will at least consider what I am going to share with you about all aspects of sports promotion.

The Local Road Program

The first and most important goal for a local road-racing program is to promote the growth of the sport at the local level. You never, ever sacrifice the local program to promote a regional or national program. The truth is that with properly designed and coordinated programs, you can promote all three, local, regional, and national programs to their maximum potential.

From a promotional perspective, the most important athlete is not the big super champion but the average racer on the local circuit. The USCF is presently learning this lesson the hard way. They had gotten so big and powerful that they thought they could force the little guy to put up with whatever garbage they decided to hand out. They forgot two important things.

First, cycling is competing with all other sports and forms of entertainment for those athletes. To get new ones and keep the old ones, we must provide them with better enjoyment service than any other form of entertainment. They can just as easily go anywhere else as come to cycling and many did just that. I call this going surfing.

Second, they can always form their own federation to govern their local racing. The vast majority of racers only race on a local to regional circuit and don't really need a national program. The US riders have also formed their own regional governing bodies.

This is a very important lesson because sponsors pay for exposure to large numbers of people. When most of the racers left the USCF, the sponsors could no longer get the exposure they were paying for so they are also leaving the USCF. Basically, the sponsors follow the crowd. If the crowd leaves, so do the sponsors. So now the USCF is going broke and laying off people.

Therefore, we must start at the bottom and build the foundation for our program around the little guy. When we design a road racing circuit, we must consider a number of factors. These factors must meet both the physical and mental needs of the racer.

Psychology

From a psychological perspective we must include such things as attention span, event burnout, and willingness to travel to events.

I have found from years of racing and coaching that the vast majority of athletes are not like Kent Bostic, John Frey, or myself. We can train year round for a few events a year and be happy because we derive pleasure from our training rides.

I have found that most people (at least 80%) have a sports attention span of about 7 to 8 days. By this I mean that, if they don't have an event every weekend during the season, they begin looking to other activities on the open weekends. This shows in their racing performance. I have found that most athletes will decrease in performance by about 1% to 2% if they miss having a race on just one weekend.

Therefore, it is important to have a printed calendar with at least one local race for every weekend during the racing season or the riders begin to lose interest and find other things to do. The calendar has to be printed so they can pin it on the wall and see a written "picture" of the next event. This permits them to focus on this event from one race to the next. The more members who receive a printed schedule in their little hands, the more riders will show up for those events.

Having training races during the week keeps even more people involved in the sport on a regular basis. In Southern California, I was impressed with

how many athletes only ride the Tuesday and Thursday races. These people are not part of the weekend races but are still a part of the sport and increase potential money's coming into the sport.

Another important thing I need to point out about this is that most race organizers have the event/rider thing backwards. A great example for this was women's track racing in Southern California. The promoters had the policy that, if at least three women showed up, they would have track racing for the women. They thought that this sent the message to women that, if they showed up, there would be women's racing.

Concerned about helping promote women's track racing, I questioned this by asking women racers at the road races and on my team if they had an interest in track racing. If they said yes (at least 50% to 60% said yes), I asked them why they were not showing up at the track races. It turned out that the message, which the promoters were actually sending to the racers, was that there might not be a race. The women told me 100% of the time that they did not want to drive across town to find out that there wasn't a race. I will address the solution to this in my chapter for local track racing programs.

The basic principle I learned from this is that you must have the event before you can have the athlete. NO ONE trains for events that don't exist.

If you don't have racers in an area and run a race, you will have racers because people will show up and become racers. If you don't run a race, you cannot have racers because they can't be racers and won't train for racing until there is a race to ride. The race must come first and promote the racing.

An important note about this for women's road racing is that, in order for women to condition to longer races, they must first have the longer races to train for. I have found it to be true for all classes that the riders always train

for the distances of the events they have to ride. If the longest race is 50 miles, they will only train 50 miles on a regular basis. If it is only 30 miles, they will only train 30 miles on a regular basis. Neither men nor women will train for races they don't have.

If women are to ever have the chance to ride longer races, they must first have those races to train for. Unfortunately, today's promoters believe that they should wait to promote longer events for women until the women condition for longer events. It just doesn't work that way. The events have to come first.

Another important factor is the willingness to travel. I have found that a good rule for a race calendar is that at least 70% of the racers will NOT travel 70 miles or more to a race more than 2 or 3 times a year. As a matter of fact, you will be lucky to get 50% to travel more than 50 miles to a race on a regular basis. If you don't believe this, do like I did and take roll for the attendance of your club membership at the races for just one year (I did it every year.) Compare the attendance to the distance to the races.

Therefore, it is important to have a race on the race calendar that is within a maximum of 50 miles of the majority of the racer population every weekend. This is one reason why we need to design and promote separate local and regional calendars. You will have two different groups of people who's needs you have to meet. That means that the average road circuit must have at least 30 to 40 races every year to keep participation to a maximum potential.

Event burnout is another factor we have to deal with because most people can't handle doing the exact same event and course every weekend. How many times will you lose the same bike race over the same course in the same direction before you go find something else to do?

You have to ask this question because most racers will never win a race. This means that we must have a full variety of Criteriums, road races, time trials, team time trials, hill climbs, series races, and stage races to keep most people interested for the long term. I will address this more under the physical need because we must consider training requirements when designing the schedule for local racing.

Physiology

The best training program includes the best racing program with aggressive racing. You cannot beat that. Add to this that your body cannot do that which you don't train it to do and the structure of a racing calendar will determine the fitness development of most of the racers.

Therefore, we must provide the racers with the best possibly balanced racing program for training purposes. Here, a good coach makes a good consultant. I want to provide you with the basics for a racing calendar that I would put together for my locally based racing program which would best promote all aspects of road racing.

We start with the weekend races and build around those. Most of these events will be designed to get a maximum number of local racers out to the races. We need a regular dose of road and Criteriums as the backbone for the circuit. These single day events should comprise about 70% of your weekend races for the year. If you have quite a few people who work Sundays and can only race on Saturdays, then you have to have a large number of Saturday events but cannot sacrifice the majority of the racers for a few.

I have found that, for promotional purposes, the best types of road races are European style, city-to-city road races. This is true for a number of reasons. First, people have to have mental focal points or reference points for the start and finish of an event to be able to relate to that event. If you have a

circuit race out in the middle of nowhere, then people cannot mentally relate to that event because very few people drive from nowhere to nowhere. We normally drive from one city to another city. Therefore, people can only relate to city-to-city events and not nowhere-to-nowhere events.

I first learned this lesson in 1969 when I won the New Mexico State Road Championships, which we ran over a 100-mile course out in the middle of nowhere.

I was all excited and told my friends and people I met about the event. They ALL listened and then said, "You know what would make a really good bike race? From Albuquerque to Santa Fe (New Mexico.)" The race they wanted to see was only half the distance but they could relate to it because it would have run from one city to another city, which is what they normally drive.

I was so impressed by this that I included this in my marketing research and found it to be true 100% of the time. The longer the road race the more people can relate to it but they can't relate to it unless it starts and finishes in a city. This means that, if you have an out and back race, it must turn around at another city or people cannot relate to it. This concept is what has made the European circuit so successful.

Second, as a matter of fact, I have found a fascination among the non-cycling population and the media with racing bicycles from one city to the next everywhere I have traveled. This makes city-to-city road racing a potentially great promotional tool for bicycle racing.

Even if I were to promote mountain bike racing, I would run my races over dirt roads from one city, town, or village to another so that people could relate to the event instead of the usual nowhere-to-nowhere format used by most American promoters.

I realize that it is more expensive to start and finish a race in a city and, often, cities don't cooperate because they don't want the bother of even a rolling closure on their streets for new events, but there is a way around this.

You see, you don't have to actually start a race inside the city limits for it to be city-to-city. If you start the event 200 meters outside of the city limits and finish it 200 meters outside of the next city limits, it is still a city-to-city road race, the non cycling community will see it as such, the media will be drawn to it as an exciting and fascinating event, and the city can't do anything about the event or be able to charge you extra for it.

If you run your road races this way for a while and they become popular enough, then you will draw the sponsorships needed to cover the extra expenses of starting the event inside the city limits plus the city will welcome any event which develops to the point of significantly increasing tourist traffic to that city.

Another way around this problem is to simply start your city-to-city race as an informal regular training ride where the jamming and racing starts and finishes at the city limit of both cities. This will become popular enough that it will draw the sponsorships to run it as a race. Always remember that there is more than one way to achieve a goal. If you can't beat it head on, then flank it.

For variety, you also need to add in some time trials and hill climbs. You should not have more than one weekend time trial every 4 to 6 weeks because most people will get burned out on them within just one or two years.

I feel that one of the biggest missed opportunities in the US is the team time trial because it is a "sponsors" race. You should have about two or three of these every year with nice trophies for the first three places and a fancy title

for the event like classic or championship. Those teams should publicly (call in the media) present the trophy with an 8x10 photo of the team to the title sponsor in their place of business for that business to display for their customers to see. This will do more to help local sponsorships than almost anything else. Put yourself in that sponsor's place and think about it.

Hill climbs are really great because they really help promote the development of climbing skills. If you live in an area where there are no mountains, you can probably still find a short steep hill you can call a hill climb. But you only want about two or three hill climbs a year. They are a specialty item.

Stage races and series races should be some of the special events that add a regular and strategically placed emphasis to the calendar. These events help to draw a lot of interest to the sport and bring in new athletes and fans. Again, too many will lose their luster and cause the riders to go into over training.

I would not have more than about 6 to 8 two or more day events in the year or about one every 4 to 6 weeks. If you expose the public to something like this too often, it becomes normal and not special. These are valuable promotion tools.

I believe that every stage race should end with a Criterium so that the spectators can see the finish of the race even if it means nothing towards determining the outcome of the event. That does not matter as long as the spectators know they are watching the finish of the race. The best example I can give for this is that the Tour de France now finishes with the last stage ending with laps on a circuit so their spectators can see the finish of the event. It works.

Let's say you have 6 stage and series races a year. I would have 3 two-day races, 2 three-day races, and a five-day race. For the local circuit, I would

only have 1 three-day race and 1 two-day race as series point's races and the rest as timed stage races. I would place one each of the top three events in the late Spring, Summer, and early Fall to provide strategically placed attention focal points to the calendar.

These events should always have a team title and the top three places should always get a nice trophy to publicly present to the title sponsor. Keep the moneyman as happy as you can and he will keep you even happier. Bring the sponsors to the race to stand in front of their teams when they are on the podium. Imagine that sponsor posting that picture over the trophy at his/her business. PROMOTE THE SPORT!!!

Every circuit should have Tuesday and Thursday races for training and promotional purposes. I feel the Tuesday races should be mostly flat Criteriums to help the riders develop speed, acceleration, recover, cornering, bike discipline, and pack confidence. These should be mostly scratch races with primes.

The Thursday races can be varied to help the riders develop a more rounded fitness. I would design this schedule on a monthly basis. It would be something like a short road or circuit race on the first and third Thursdays, a short individual time trial on the second and fourth Thursdays. The racing season will have about two or three months with a fifth Thursday that can be a team time trial or hill climb.

In the chapter "Regional Racing Program", I will discuss how to coordinate the regional racing program with the local program so you can promote both without sacrificing either.

PR Management

This is the single biggest shortcoming in US cycling. This will do more to promote the sport than anything. If people don't know the racing is there,

how can they show up? I have talked to the media in various parts of the US and always get the same complaint. It isn't just for cycling but for all sports. They show up at an event, shoot a lot of film, go onto the next event, and never get the results from at least 80% of those events so they can't use the footage. This wastes their time and money. Too many promoters think their PR job is done when the media shows up.

Of course the media response to this is that, if an event promoter fails to provide them with the results so they can use the film they spent their time shooting, they won't return to that event. They have all told me that, if they find a promoter who provides the results so the media can use the footage they shoot, they will then be a regular at that event.

Every race promoter should either be a good PR Manager or have a PR Manager. The PR Manager needs to be a very organized and disciplined person. The first thing after every event, the PR Manager should sit down with the race results (first 3 to 5 places in each class) and a phone. He should either phone or fax the results to every television station, radio station, and newspaper that will work with him. PLUS tell them about the next event including the event name, date, time, and location.

Two years after I began racing, based on my early market research, I set up and ran a series of events in New Mexico, which provided us with a race on every weekend. I contacted all of the media and got contact names, phone numbers, and desired content for the race results and future events for each medium.

Before the events, I notified the cooperating media with information about the first event. After every event, I immediately phoned in the results. The media response was very good after just the first one to two weeks. Unfortunately, I also happened to be winning all of the Senior Men's events so certain of the racers accused me of running the series to promote myself.

What they failed to realize was that within three months, the number of licensed racers in the state better than tripled and the number of event participants tripled to quadrupled. If I had been promoting myself, I sure wouldn't work so hard to increase my competition.

Promoters, even if you really don't care about the sport and all you care about is making a buck, you should know that your potential income increases as the number of riders and spectators increase.

Therefore, it is to the benefit of every event promoter to promote the sport. You will reap the benefits next year.



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Part VI • Chapter Five

Local Track Program

Local Track Program

One of the things we studied in Athletic Administration was facilities management. In facilities management, we had to consider maximizing the efficient use of all our facilities. By definition, a Velodrome is an athletic facility and falls under Athletic Administration.

In this chapter I want to pose the question of how to maximize the efficient use of a Velodrome for the promotion of track racing at the local level. Therefore, I will offer suggestions in the means of how I would organize and manage the various types of events required to properly promote track racing for all groups.

Goals

The primary goal for any Velodrome should be to maximize the development and growth of the sport. This should be common sense since it will maximize the potential revenues and profits for the facility. It will also maximize the social benefits derived from the facility by the community.

The secondary goals I would consider would include training for entry cyclists, maximizing training opportunities for all cyclists desiring to use the facility, providing developmental programs designed to maximize learning and experience benefits for upper level competition, maximize racing opportunities for all classes, and maximize the enjoyment of the facility by spectators. We will take these programs one at a time and then build a coordinated weekly program to maximize the promotion of the sport.

Entry Programs

The entry program is designed to provide the best quality training and education for new riders prior to being permitted to race. These programs need to be properly structured providing all of the types of information found in this book including rules and track protocol, riding and racing techniques, training, strategies and tactics, and bike discipline.

There needs to be both class room and track riding instruction including practice races at the end of the course. I believe that every Velodrome should have at least one classroom with a minimum capacity of 40 students. These classrooms can also be used for club meetings, clinics, and other productive meetings.

The Velodrome should have such classes on both evenings and weekends. If the volume is low at the start, you may want to alternate the classes so that one series will be run in the evenings and the next series run on the weekends. Some areas may find that only one of the times will get enough participation to continue the program.

Training Times

One of the main reasons I have heard from cyclists as to why they don't race track is that the facility is never open for training when the riders need it or it is only open by club reservation. A track racer needs to spend time on the track at least one day during the week.

A properly funded track should be able to make sure the facility is open from very early morning until late evening except for times reserved for special programs. You can actually use this to promote track racing by marketing cycling as a healthy and fun workout similar to training in a gym or spa offering training memberships similar to health club memberships.

Most of the potential racers will be weekend warriors just as in road racing. This means that the facility must provide training opportunity for those people. The most common times for such training are very early mornings and evenings to late night. But daytime hours provide considerable potential to promote cycling and community fitness, especially if the track has facility equipment such as bikes and helmets.

For example, I would promote a housewife program to encourage learning track cycling for health, social purposes, and a fun way to help control weight. Other programs, which can take advantage of such a facility during the day, would be high school and college classes and structured after school cycling for Juniors before most people get off of work.

Another thing you can do is to encourage a lunch exercise program for working people between 11am and 1pm. They can even rent facility bikes and helmets to just ride around the track during lunch for exercise. The main thing is to use your imagination and learn from other sports and health facilities.

Developmental Programs

Most of the facilities I have seen permit clubs to reserve the facility for evening training programs. This limits the use of the facility because each club will need at least two hours between 6pm and 10pm. That means a maximum of two clubs can use the facility per night or a maximum of 10 clubs per week. The rest of the clubs in the area would be prevented from being able to develop a track-racing program. Therefore, this limits the growth potential of the facility and sport.

For example, when I was coaching, there were over 120 teams in Southern California with 3 Velodromes. With this practice, a maximum of 30 clubs would be able to develop a track-racing program leaving more than 90 clubs

out of track racing. This means that only 40% of the cyclists would have access to track racing and 60% are out of luck. In most areas, it is worse than this because they only have one track shared by 60 or more clubs.

Instead of this practice, I would structure development related programs that would permit all of the clubs to use the facility at the same time in a productive manner. These would be structured racing/training programs run two or more nights per week and Saturday mornings. These programs would focus on providing the racers with regular competition in the championship events, which are found to be boring to all but the most avid spectators. These events include matched sprinting, pursuing, one-kilometer time trialing, and team pursuing. These events are structured for the athletes and most ardent spectators.

One example of how to structure such a program for Saturday mornings would be to have sprinting and kilo time trialing on the first and third Saturday's of the month and individual and team pursuing on the second and fourth Saturday's. This permits the clubs to work with their athletes on these events at the same time. The coaches can structure the athletes training for the coming weeks based on the riders' performances at these events. The riders could do their training during the week on the track and road.

You can complement this program by holding match sprinting and kilo time trialing on Monday or Tuesday evenings and Pursuing on Wednesday or Thursday evenings. The rest of the evenings should be open to public training.

Two Part Racing Program

You also need a racing program, which will best promote spectator viewing. The most enjoyable events for all but the most ardent (usually former trackies) spectators are the pack events such as scratch events, points

racers, miss-and-outs, and Madison's. These events should be run at a time designated to promote the maximization of spectator development. The development of the spectator end of the sport is grossly ignored and necessary for the growth of the sport financially.

Sponsors don't sponsor events so athletes can have fun competing. They sponsor events to get business (branding) exposure to spectators. The more spectators we get, the more money we get to run events and help our racers. Everyone should be concerned about this part of the sport. I refer to these events as show time because the riders are putting on a show for spectators. To get the largest possible number of spectators, we need to put on the best possible show. Remember that cycling is competing with all other forms of entertainment for people, including spectators. Therefore, we need evening events that will provide the average person with the best possible show.

As stated above, these are the pack races. But we need a two-part program for the classes that need to gain experience in these events such as beginners and for less developed classes (at most tracks, Juniors and Women.)

The second part of the program should be the real show with the best-developed and most experienced classes such as Men's upper levels and Pro racing. This is the part of the program designed to bring in the spectators to generate sponsorships, concessions, merchandising, and gate receipts. This part of the program needs to keep moving with as little dead time as possible. A good staging director is crucial to keep athletes ready to ride as one event finishes. If you have more than one or two minutes between events, except for a refreshment break half way through the program, you will bore the spectators to death and run them off.

As I stated on the Local Road Program, I was trying to help promote Women's track racing in Southern California and decided to find out what the

women wanted to show up at the races so I asked them. Their biggest complaint was that the organizers at the Velodrome had a policy of, if 3 or more women show up, there would be track racing for women, if not, then no track racing because it would be boring to watch a woman ride around the track by herself which would hurt spectatorship.

The simple solution to this is to have a separate session for developing classes just before the main evening racing. This way, you can promise the women and other under developed classes that there will be some form of racing for them if even just one rider shows up because you don't have to worry about the spectators. This in conjunction with the championships events programs will provide regular racing for all classes even if just one rider shows up in that class.

I have learned that, to really build a less developed class, you have to keep the one or two who initially show up coming back. If they keep coming back long enough, word will get around the cycling community that there is always racing for that class and others will show. If there isn't always racing, few if any will show and it will go nowhere.

Remember that the event must precede the athletes because the athletes only train for events that are being run. NO ONE trains or shows up for races that don't exist. Consistency is the most important aspect to race promotion. Always be there.

Professional Racing Programs

Again, I must repeat that more people show up to watch professional sporting events than amateur sporting events. The word pro is special and gets more attention. Promote the sport!!! As soon as you have at least 8 to 10 trackies who are experienced enough, I feel every Velodrome should promote and encourage local, minor league pro racing for men, women, and

even masters. These special events can be run on either Saturday nights with the other show events as the main attraction or Sunday evenings.

Miscellaneous Programs

With some imagination, you can create additional programs to help promote the facility and the sport. These include collegiate racing on Saturday afternoons, high school racing on Friday nights, junior high school racing on Thursday nights, and even military racing if you are near a military base (inter squadron competition for one base or competition between bases.) You could even enhance your housewife program by adding racing on a certain day of the week. Use your head and promote the sport.

Special Events

Just like in road racing, there should be three major special events strategically placed on the calendar to give a special highlight to the season. These should be placed with one in the late Spring, Summer, and early Fall. These break the weekly routine providing special enjoyment for the sport. These can be invitational events, championship events, or events that are part of a larger circuit.

Weekly Program

So what does our weekly program look like? We have open training at the facility from about 6am to 10pm, a housewife program for about two hours between 8am and 10am at least three days per week, lunch time riding, Junior development program in the afternoon, junior high school racing for two hours Thursday night, high school racing for two hours Friday night, Olympic and championship development program Saturday mornings, collegiate and/or military racing Saturday afternoon, two part pack/spectator racing Saturday evenings, and pro racing or special events on Sunday evenings.

There will be very little downtime for the facility and we have maximized the reasons for people to use the facility because we have something for almost every one. If properly managed, there is no way such a facility could possibly be used as a multisport facility during the racing season.

As a matter of fact, I would run two different seasons to maximize the promotion of the facility and sport. The Spring and Summer professional, Saturday spectator, collegiate, high school, junior high school, and military events would concentrate on most of the pack races such as scratch races, points races, and miss-and-outs. I would run a separate season during the Fall for Madison racing for all of those groups.

This would shorten both seasons to keep the racing more interesting and exciting. Set up a point system for both seasons and give trophies at the end of each season. This will especially draw in schools and organizations. You could even have racing between the employees of businesses.

PR Manager

A good track program needs a PR Manager at least as much as a good road program. This person should be responsible for working with the media with regular press releases, events results, event and calendar information, and rider information.

In track racing this person should also work to maximize exposure for such programs as the housewife program, school programs opportunities, and such. This person can also work to sell schools and other organizations on using the facility to develop a special program. This person should be involved in developing special events.

Coaching Programs

Every facility should have a local coaching program. This program should be designed to provide proper training at the beginning, intermediate, and advanced levels of coaching and special clinics. The better trained the coaches, the better the athletes will do.

I have found that better quality coaching helps riders enjoy the sport more and keeps them in the sport longer. The more you know what you are doing, the more you will enjoy what you are doing.

These programs should have structured classroom sessions and hands-on sessions on the track itself. They should cover all aspects of coaching and cycling. You will find you can get a lot of information and guidance from this site in setting up such programs.



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Part VI • Chapter Six

Regional Racing Program

Regional Racing Program

In designing a regional program, you must keep some basic ideas in mind. First, you must remember that the majority of the riders who will be present in the lower categories will be local riders. The upper categories will be comprised of the most serious riders from your region and even nationally who travel to the bigger events.

A regional event must be designed to meet two basic requirements. First, to meet the needs of the local riders who normally race in your immediate (non-regional) area. Second, it must meet the needs of the relatively few regional to national riders who travel for such events.

In setting up your regional calendar, you must get together with the other promoters and clubs in your area who want to stage regional events. These events will be events for which promoters are actively working to make them regional to national events AND events for which riders from other parts of that region or local areas like to participate in. This is where promoters must listen to the desires of their clients, the racers.

Your event placement on the calendar has to take several things into consideration. First, is your event popular or gaining popularity at the national level? If so, then your placement on the calendar will be largely determined by where you can get it placed on the national calendar.

Once the events from your region, which are able to draw a national field, get their positions on the national calendar, then you build the rest of your regional calendar around the events FROM YOUR REGION AND ONLY FROM YOUR REGION that are on the national calendar. In order to properly promote regional racing in your region, you MUST have a full-published regional calendar of at least 30 to 40 races for the riders in your region who like to travel.

The most common mistake in the US is to build a regional circuit and expect it to also be your local circuit. This will either kill or hold back the development of your local racing.

In designing your regional calendar, you need to properly structure it for the best promotional effect and to allow the best possible training for the regional riders in your area. This means that, for training effect, you need to have only about 6 to 8 series or stage races per year to keep the riders from overtraining. The bulk of the circuit should be single day road races and Criteriums. Then you should toss in time trials, team time trials, and hill climbs to fill out the program in a balanced way.

This would mean about one time trial every 4 to 6 weeks; about three team time trials per year, and about three hill climbs per year. This balance will provide the best and most interesting mix of racing for everyone.

For promotional purposes, build most of the circuit around the few national events in your region. You should try to have your top three events spread out between April and September to keep the media and general public focused on your circuit as much as possible. You should have your next 6 to 8 best events scheduled so that they average one every month. Then you fill in the rest of the circuit as needed.

As many of the road races as possible should be city-to-city road races to maximize the promotional potential. Remember that the general population and media will only be able to get a good mental picture or grasp on a road race if it is run from one city to another city. You can even use this bit of spectator and media psychology to promote other events by having hill climbs start in a city, run a time trial or team time trial from one city to another city, and having city-to-city stages for your series and stage races.

After your regional calendar is set and balanced, the local promoters should meet and build a complete local circuit around **ONLY THE REGIONAL EVENTS RUN WITHIN 50 TO 75 MILES OF YOUR LOCAL CIRCUIT**. It is very important that you not sacrifice a local event for a regional event being run out side of your local area. Many promoters do this thinking it will cause more local riders from other areas to come to their event.

I have found this does not happen. Most of the local riders will not travel to another local circuit for a regional event. They will just not race and, even worse, will find something else to do. I have found that, if they find something else to do which they enjoy and they can enjoy it more regularly on a local basis, they will chose to do that something else instead of returning to bike racing. You must keep them in the sport by keeping the sport near them every week.

By using this system to properly design and build your racing circuits, you should have racing for everyone every weekend and even on Tuesdays and Thursdays to maximize the enjoyment potentials for cycling's clients, the racers.

In other words, if a rider wants to ride locally as most do, then there should be a local event for that rider every weekend or he will go else where for his entertainment. If a rider wants to race regionally every weekend, then there

should be a regional race every weekend (all of which will also be local events for the local circuits in which they are staged.) If a rider wants to race nationally, there should be a national event for that rider to race every weekend.

The proper technique is to use the biggest races with the biggest riders only to promote the littlest races for the regular riders. If you don't promote grass roots, your grass won't have roots and will die.



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Part VI • Chapter Seven

Minor League Pro Racing

Minor League Pro Racing

In US cycling, there are some people who presently have control over cycling and have a misunderstanding about the structure of pro sports. They wrongly believe that if riders who are not our very best cyclists turn pro, then pro cycling will not receive the respect of other American pro sports.

But, they need to explain this to the other pro sports who, by the way, all have minor league pro circuits with athletes whom are not all among the finest in their sport. But they do all love their sport.

The best and most obvious example is Baseball which has seven levels of minor league pro circuits. There are pro athletes in the two bottom levels who may not be able to make a starting line up on one of the top five to ten college teams. But do these people receive any less respect from the people who pay to watch them play? No. The people still cheer them on, get their autographs, and tell friends when they "know" one of these pros.

But baseball isn't the only sport in the US that has a pro minor league circuit. As a matter of fact, all of the top pro sports in the US have some form of pro minor league or farm program.

Basketball, ice hockey, soccer, and other sports all have minor league circuits. Golf, tennis, and bowling have their B and C circuits. NFL football even uses Canadian pro football as a form of minor league and is starting circuits in other countries like the European Union and Mexico. Indy Car,

Cart, and NASCAR all have a variety of pro circuits down to your local dirt track, which act as a farm program for them. There isn't a successful pro sport in America that doesn't have some form of farm program. Now why would they look down on us for doing the same? If anything, it would gain their respect.

Hmmm, let's see, American pro cycling isn't that successful and doesn't have a farm program. I wonder if that means anything. You bet it does. Minor league pro sports are grass roots pro sports and help promote the sport at the local level.

As a matter of fact, it was minor league pro baseball that saved baseball's butt when the "big boys" went on strike and cancelled an entire year of major league baseball. Where did all those fans go? To car racing? Maybe to cycling? Or how about surfing? No, they went down and enjoyed watching those delightful nobodies in minor league pro baseball. You know, the ones who will still talk to you and give you an autograph for free.

It was refreshing and brought a new freshness into baseball. It may have been the best thing to ever happen to modern day baseball.

European bicycle racing is probably so successful because it has a very layered farm program with different levels of pro licenses and circuits. You can race professionally at the local level and never travel more than 50 miles from your town.

I knew a local pro from Germany who worked part time for his sponsor shuffling papers behind a desk and raced the rest of the time. Some countries in Europe have pro licenses that go down to category four for category three amateurs who turn pro.

About 30 years ago, in the late 1970's, I got a job working in a health club as a fitness instructor. In the interview, my boss must have asked me at least four or five times if I was a pro cyclist.

Every time I told him no and explained that there wasn't any pro racing in the US at that time. Three days later when I showed up for work and began introducing myself to the patrons of the club, I found out that my boss had spent those three days telling everyone that he had hired a professional bicycle racer.

You see, my boss knew that people who love sports hold pro's in a higher level of reverence than they do amateurs. He was hoping my pride and their admiration would keep me from telling the truth.

Everyone who has ridden a bicycle is an amateur cyclist. If I pickup a golf club or tennis racket, I am an amateur golfer or tennis player. If I put my delightful mutt in a basket on my bicycle and ride him around the block, he is an amateur cyclist. Every person or pet on this planet that has played one sport just one time is an amateur athlete.

But a pro is different. He has to make a decided commitment to his sport to become a pro. It doesn't matter how good or lousy he is. He is a pro, and that is something the rest of us wish we had the guts to become. We respect him for that. He is a pro.

When I introduced myself at that health club, nobody asked me how good I was or if I had won any races. That didn't matter. For all they knew, I could have been the worst professional cyclist in the world. In their minds, I was a professional athlete.

They grabbed my hand, started pumping it, and started jabbering away about how great it was to have a professional athlete in the club. It took me several minutes to cut in and tell them that I was just another amateur athlete..... like them. You should have seen the change in their respect for me. It stopped existing instantly. I was just like them and nothing special.

Potential Benefits

Economics

At least 80% to 90% of the businesses in America cannot afford to sponsor a nationally traveling pro cycling team. Most of them don't have a need to anyway because their market is local or regional and not national. To restrict American pro racing to only the national level denies US cycling the potential income from the rest of those businesses

Oh, but we want to reserve that money for our amateur programs. You'll never get most of it. Walk into a decent sized business with six riders and tell them you are looking for a sponsor for an amateur cycling program. The owner will tell you to bring him a 5 x 7 picture of the team picture he can place on the wall with his little league baseball team and give you from a few hundred dollars to one or two thousand dollars. He considers a "warm, fuzzy gift and that he is being a nice guy by helping you."

Now, walk into that same business with the same six riders and tell him you are putting together a pro cycling team. Suddenly, he starts talking some decent cash. This extra money can make the difference between some aspiring riders making it or not making it. Plus, you can also budget your amateur program in with the pro's as a "farm" program for your pro team and, probably, get more money for the amateur team.

You also have to understand the human ego. In the business world, there are things, which give a person a little extra prestige. Owning a pro sports team is one of them. Of course it is best to own a major league team but most business owners can't afford to buy or own a major league team. But they can afford owning a minor league pro team and it still puts them in that very small group of people who OWN A PRO TEAM. These people would LOVE to go to their country club and have the other members ask them how their pro cycling team is doing. Bet on it.

Establishing owning a minor league pro cycling team as a thing of social prestige will go a long ways in promoting the sport. Then you have the smart promoter who comes along and convinces the owner that having a pro team is good but it would really be nice to have more local events to show off that team. Especially if the owner ran special sales in conjunction with the events and had autograph signings at HIS races by HIS pro team and gave away free race and team merchandise as promotions and.... watch racing grow.

Spring Board

With the increased earning potential of being a minor league pro instead of a cat two or three amateur, pro racing will be an outstanding springboard for racers to reach the majors.

Many more racers will be able to persist long enough to become an accomplished major league pro. We would have to start by having the riders ride in their existing classes as pro-am races until there are enough pro's in their classes for their own full pro races and until race promoters provide separate full pro races for them. With them being pro's, promoters will find it easier to raise increased moneys in sponsorships for higher purses.

The higher sponsorships, purses, and endorsements from local businesses will all work toward helping more riders climb from cat 3 to pro. I doubt if very many of them will drive expensive cars as minor league pro's (some will) but it will make it easier to pay rent, cover race expenses, and have the time to train year round. But this is what pro minor league sports are about. Most don't get rich. They get a better chance.

The minor leagues also serve as a safety net for those who make it to the majors and, for some reason, find themselves without a pro team. The minors provide pro's a second chance to stage a come back. When a major league team loses its sponsor, the riders on that team will be more likely to get a ride on a minor league team until another major league team can be put together. They won't just starve or have to quit the sport the way they do today.

Rider Psychology

Over the years, I have noticed an interesting phenomenon, which regularly occurs in all sports. There are a lot of athletes who don't take their sport very seriously as amateurs and don't perform or show much potential.

When they turn pro and realize that they are now racing for rent, suddenly, their attitude changes and they become super stars like Tony Dorset. It is interesting how many walk-on pros that were not worth talking about, as amateurs became stars after turning pro. I have talked to some of these athletes and just turning pro changed their thinking and attitude.

I have often wondered how many Tour de France stars or world champions we have lost because we did not have minor league pro cycling to change their attitudes before they went to play somewhere else. What have we lost and how much more will we lose before we start minor league pro racing?

Youth Programs

Pro football is having the same problem we are today with getting young kids into the sport to replace the older kids who leave or die from old age. To solve this, the NFL is sending the pros out to youth football programs to encourage more kids to get involved in football.

With minor league pro racing, cycling has far more potential than football or basketball. Imagine a teenager telling his friends at school that he trains almost every week with the local pro team on their easy days and off season training. You know that far more of their friends will want to become cyclists and ride with pro racers on a weekly basis than with some cat 2 or 3 amateurs.

It's the same rider, but he or she is a pro. Why sit at home watching pros on TV or reading about them in magazines when you can ride with pros on a weekly basis? You think more kids won't want to be bike racers? You bet they will. It could be the best thing that ever happened to Junior racing in the US. It works in Europe.

A minor league pro circuit for women will do wonders for Junior Women's racing. Imagine how many more young ladies will find racing exciting if they can train with local female pro's on a weekly basis. How many sports do you know of where young girls can train on a weekly basis with female pro athletes?

Sport Development

European cycling and other sports tell us that a minor league pro circuit will meet the needs of a number of different groups of people. First and foremost

will be the young, aspiring athletes attempting to make the major league pro ranks.

The second group will be middle-aged pros that have given up on making the majors or may have been there. They will continue racing professionally because they love the sport and the extra income will supplement another income and make it easier for them to train regularly. A third group will be Masters class racers who like having someone else cover more of their racing expenses. This will keep more of them in the sport longer. These people will become a reservoir of knowledge and experience training up our future champions.

With more experienced racers staying in the sport longer and passing on what they have learned to younger racers, the sport will improve and the US will field more champions on the world circuit. We will become a world super power in cycling for the long term. We will finally have arrived at the top.

Suggested Program

The program is very easy to start. Just reduce the pro license from \$600 to \$50 and add a category three pro license for amateur cat 2's turning pro and a category four pro license for category three amateurs turning pro. Declare that all Men and Women's category 1-3 races will be pro-am until there are enough pro's in their area to warrant pro-only races for that category and get the race promoters behind it.

Other possibilities include running pro-only races for cat 3 and 4 pro's or cat 1, 2, 3, and 4 pro's. Each area will have to structure its own pro racing based on rider populations and will have to make changes as the sport grows. Then educate everyone on the intentions of the program and its long-

term goals. Next, encourage experienced riders from good cat 3 amateurs up to consider turning pro to help promote the sport.

We also need to provide these athletes with some guidelines for organizing and marketing local to regional pro teams to local to regional businesses. Get the cycling industry behind the program by sponsoring some of these teams to help jump-start the minor league circuit.

Then we let it grow naturally while being there to help work through the growing pains.



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Part VII • Chapter One

The Media

The Media

I just finished watching a television journalist refer to Armstrong finishing 28th in a New York Criterium as you would refer to a placing in an individual sport. Even in marathon running, they use more team tactics than journalists realize are used in bicycle road racing.

When you realize that bicycle road racing requires far more advance team tactics than marathon running, then you also realize how much valuable and interesting information is being left out of the interviews with professional cyclists.

When I was coaching, I regularly had professional bike racers who had just been interviewed by the best cycling journalists in the US come to me shaking their heads and saying, "Coach, they don't even know the right questions to ask."

Because of these things, I have decided to write a page providing directions for journalists in asking the right questions following an event. This is being done in order to provide more accurate and complete race coverage for the general public and help promote the sport of bicycle road racing.

The first and most important thing that any journalist must remember when interviewing a bicycle road racer, is that properly developed bicycle road racing is a **team sport**. Therefore, with few exceptions, the first and most important question a journalist should ask a bicycle road racer following an event is, "What was your team strategy for today's event?"

This question will automatically set the rider to discussing bike racing as it should be discussed providing considerable information for the journalist and readers/viewers. You will be surprised at the details the rider will quickly offer concerning team strategies and tactics.

Other topics and questions that should be considered are:

- ✚ Why did your team set their team strategy up like that?
- ✚ How did your team strategy fit with the course setup and race format?
- ✚ Was your team strategy effective?
- ✚ Did you have to modify your team strategy and how did you modify it?
- ✚ What were the team strategies of the other top teams?
- ✚ What do you think were the team strengths and weaknesses of your team/the other teams for this event?
- ✚ Which teams did the best job of controlling the peloton, why, and how?
- ✚ How did your team attempt to develop your team strategy?
- ✚ How did your competition try to counter your team strategy?
- ✚ How did your competition try to develop their teams' strategies?
- ✚ How did you try to counter the other teams' strategies?
- ✚ Which teams did the best job of controlling the race and how did they manage that control?
- ✚ Who made the winning attack and when did he make that attack?
- ✚ When did your team realize the race was going to be won by a break?
- ✚ What did your team do to counter the winning break? (assuming they missed the break)
- ✚ What did your team do to support the winning break? (assuming they made the winning break)
- ✚ What did the other teams do to support/counter the winning break?
- ✚ What did your team like or dislike about the winning break?

- ↩ When did your team realize the race was going to be won by a pack sprint?
- ↩ Which teams did the best job of controlling the sprint set up?
- ↩ How did your team set up for the sprint?
- ↩ How did the sprint develop? (usually for the last 3 to 5 miles)
- ↩ Were there any particularly good rides or efforts by riders on your team or other teams?
- ↩ Was your team satisfied with their effort and results today?
- ↩ Do you feel there is anything, which the team needs to work on for future races?
- ↩ How good is your team chemistry this year?

These questions should give any journalist a good start for an intelligent interview and discussion. They will set the tone of the interview so that you will get the most significant information. As you gain experience in asking these questions, you will develop other questions along the same line.

The non-journalists reading this book should request that journalists review and answer these questions. This will help you, the cyclist, get more valuable information from the pro riders and teams in order to help you better understand the sport and improve your own racing.

Answering these questions will provide much more detailed and interesting information, which will increase your knowledge and enjoyment of the sport.



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Part VII • Chapter Two

National Program

National Program

In this chapter I want to offer ideas for the improvement of cycling governing bodies.

First, I find it necessary to explore some of the problems and then offer solutions based on my training and experience. I believe we can improve our national and regional programs in a way that will benefit everyone and the sport. It should be understood that I will be approaching this problem from both a coaching and economical basis. From my training and experiences in both areas, I know that this must be the case. I ask that you at least consider my ideas as food for thought.

The Problems

One of the most significant problems we face in this country has to do with the quality of coaching. This problem is largely due to a lack of decent paying jobs for coaches to draw more professionally trained coaches into the sport. This is largely due to the effects of a centralized national coaching and teams program that is based on concepts that are over 100 years old. The single most significant thing we can do to help improve the sport is to provide better quality coaching at all levels in the sport and not just at the top.

When I was coaching, we regularly made contact with potential sponsors who stated that they would love to sponsor a competitive cycling program

but could not justify it because of the way the United States Cycling Federation national sports program is structured and managed.

This is not meant as a slight against the USCF but as recognition that a centralized national program is antiquated and needs to be modernized to increase sponsorship moneys flowing into the sport. In other words, we need to over haul the national teams program to bring the sport of cycling into the 21st Century. We must change or be left behind because the world is quickly changing about us.

We found that the reasoning for this statement was this. If I, Corporation A were to sponsor a local to regional team to provide coaching and support for the purpose of developing racers for upper level racing and one of my competitors, Company B, is the sponsor of the national teams program, when my riders achieve national to international racing abilities, they will be required to compete and provide exposure for my competitor on the national team. Why should I spend my money to develop quality riders who will provide great PR and help increase business for my business competitor?

To over come this, we had to promise our sponsors that we would be training our riders up strictly for professional competition and not send them to the national teams program. You see, every sponsor for the national teams program eliminates all other sponsors from the same industry from funding developmental programs for the sport because what they are actually doing is spending their money to provide quality athletes who will in turn promote their competitor over themselves. This means that the present centralized national teams program is in competition with all of its member clubs and decreasing any sponsorship potentials.

By decreasing the sponsorship potentials for local to national programs around the nation, we are also decreasing the number of jobs available for

coaches. Decreasing the number of jobs for cycling coaches decreases the income potential for all cycling coaches, even those on the national staff.

The coaches on the national staff need to consider this for several reasons. First, in over 35 years of being in or around the sport, I have never seen one coach last on the national staff long enough to even come close to achieving retirement. Most coaches last less than 5 years with very few lasting longer than 5 years. This means that the coaches presently on the national staff will probably be gone in the next 5 years. The question they need to ask themselves is, "When I leave here in the next 5 to 10 years, where will I get a job coaching in cycling?"

What they need to do is to completely over haul the system to increase the number of coaching jobs across the nation so they will have job opportunities when they leave the national program. They also must realize that they need to over haul the system to increase the job opportunities to also increase their own income potential.

It should be common sense that, if we increase the number of jobs for coaches, we will increase the demand for cycling coaches. If we increase the demand for cycling coaches, then we increase the asking salaries for those coaches. If we increase the salaries for cycling coaches, we will draw many more full time coaches into the sport.

By keeping the USCF as one of the main employers for cycling coaches, we limit the demand to relatively few programs and limit our own income opportunities. We are only hurting the athletes and ourselves.

The athletes are being hurt because we are limiting their access to quality coaching at the mid to lower levels where it is needed most. The sport is

being hurt because many people leave the sport every year because they simply cannot get the coaching they need to be competitive at those levels.

Suggested Solutions

In order to achieve our goals, we must completely overhaul the entire national program system. But we must do it in a way that will best benefit the coaches, athletes, local to regional programs, and the sport in general. We will not only need to restructure the national coaching program but also the national teams and staff selection process to be completely objective in nature.

This will involve changing (1) the coaching licensing to be completely objective, (2) eliminate the centralized national coaching staff so these coaches can be in the field where they are needed most, (3) establish a completely objective national teams selection process which will not only select the athletes and teams but also select the coaches and other staff members which will support the athletes in international competition, and (4) add a positive incentives program to the presently existing negative program to help decrease the drug abuse problem.

If done properly, this will provide more international experience for more athletes, coaches, and other staff members and increase the quality of competition in the US.

Licensing

Ever since before I began racing bicycles over 35 years ago, every time a new national coach was hired, there was a new licensing program for coaches that almost always meant that existing coaches had to jump through new hoops to be able to keep coaching cycling. It should be

common sense that this does not encourage cycling coaches to stay in the sport.

Any cycling coach should be able to get a license at any time and regardless of time spent away from the sport based entirely on his training and experience. It should be common sense that a coach does not completely forget how to coach simply because he has been out of the sport for a few years.

Plus we need to professionalize the position of coaching in order to get more coaches and future coaches to be more professional themselves. I believe we need to create a separation between the casual or weekend coach and the professional coach. I suggest establishing two separate classes of athletic instruction to make a clear designation between the two. Yet we need to be careful to not insult or demean the weekend sports instructor because they are a valuable tool for the sport.

I propose that the weekend sports instructors should be licensed as Club Instructors and the professional sports instructors should be licensed as Coaches. The Club Instructors should have three categories with the education requirements being a series of two-day courses on coaching from licensed coaches. This will make such training easier to obtain since any licensed coach of category 2 or better will be permitted and possibly even required to at least make such courses available in their region of operation during the off season depending on need for their area. This will decrease the travel required for most people who want to help racers by providing instruction more locally.

Licensed coaches should eventually be required to obtain a minimum education in the sports sciences as I have explained in my chapter about coaching along with sports specific instruction from other licensed cycling

coaches. For promotion and hiring purposes, I would use a points system where a coach is licensed and then promoted in category based on college education, sport specific education, experience, and results. There should be four categories for licensed cycling coaches with a minimum of sports sciences courses and one or more sports specific courses being the requirement to obtain a category four coaching license.

Does this mean that we just dump any presently licensed coach who does not immediately qualify as a professionally trained coach? No, of course not. These people have been giving to the sport and we owe them the opportunity to chose their license and earn a coaching license if desired.

We should give them a reasonable grace period to earn the position of coach. For example, we would require that they take a certain number of college courses in the sports sciences over a period of time with appeals in the event that reasonable circumstances should cause a brief delay in their studies. This grace period should be at least 8 to 10 years for a fully qualified coach, which permits sufficient time to obtain at least 30 to 40 hours of college courses, which should be the initial minimum requirement to be licensed as a coach. Of course we will need incentives for people to obtain this much education and I will discuss these incentives as I develop the program.

We also need to provide at least two routes for people to move from being a club instructor to becoming a coach. The first would be the direct route of obtaining the required education and simply upgrading. I believe that we should also consider having an intermediary system similar to the one used by the military for enlisted personnel to become officers through the Warrant Officer program.

We should have a Warrant Coach program where a person can earn their way up to a certain level of professional coaching without completing all of the education requirements but by obtaining considerable experience. We should have two classes of Warrant Coaches. To upgrade from a warrant coach to a full coach, you would still have to obtain a minimum education in the sports sciences but all of your experiences and results for upgrading in category as a coach will be transferable. Coaching experience is coaching experience. This means you could go from being a club instructor or warrant coach to as high as category one coach just by completing the required education.

This licensing system will make it easier for the coach to objectively market himself for the best possible dollar because the governing body will have established guidelines for upgrading and, therefore, value. It also makes it possible for teams, clubs, sponsors, and riders to objectively select coaches to meet their needs.

For example, a category 3 or 4 club instructor would do fine for category 4 or 5 racers but not a category one amateur rider. A category one or two rider is going to want at least a warrant coach or category 3 coach. A category one or two coach will find it much easier to obtain the sponsorship for a pro team because they will be able to hand a respectable list of qualifications to any sponsor. Having such qualifications will also make it easier for coaches and instructors to justify and obtain deserved pay.

This system also makes it possible for a coach or club instructor to leave the sport for a while and reenter without having to start all over at the bottom. You would simply walk in, drop your transcripts and other credentials on the desk, pay your licensing fee, and walk out with your license. This will encourage former coaches to return to the sport and help keep the number

of coaches and instructors up. It also makes it possible for coaches to take an educational sabbatical or just a break from the sport.

Selection Process

The team selection process needs to be completely objective for the athletes, coaches, and staff if we are to advance into the 21st Century. This is easier to do than most believe. First, we must set goals around which to build our selection process. We need to recognize that, when we are sending individuals or teams to represent our country in the World's, Pan Am's, or Olympic Games, we should be sending the riders who are most likely to win.

Any coach or top level athlete will tell you there is a big difference in knowing how to win and knowing how to place. Therefore, our first goal must be to select athletes who know how to win.

Everyone generally agrees that our second goal should be consistency. But the mistake that has always been made here is to test consistency in placing instead of consistency in winning. Therefore, our program should test consistency in winning and **ONLY** consider consistency in placing as a tiebreaker. We also want to minimize the potential for a tie.

Next, we need to eliminate another obsolete tradition in our national program selection process. We have been doing fine in selecting individuals for individual events. When it comes to selecting athletes for team events, the entire nation is still in the dark ages. In spite of the lessons we should have learned from the Soviet Union and East Germany, we still select a group of individuals for team events.

There are any number of excellent examples for this. The 1988 Women's Olympic Road Team is perfect. They were permitted to have only three

riders (someone needs to educate the IOC to the fact that bicycle road racing is a team sport and that the minimum effective team size for road racing is 7 riders) for the Women's team. We sent 3 team leaders and, as would be expected, they all three sat around waiting for the other two women to rider for them. This is no slight against these women. It is only natural for team leaders to ride like team leaders. What was done was like making a football team out of nothing but quarterbacks.

I am waiting for this grossly over hyped American basketball "dream team" to turn into a real nightmare because we insist on sending groups of individuals to the Olympic Games instead of actual teams. In the last Olympic Games, they got in trouble and came close to losing. It is only a matter of time and another country will have enough great NBA players to make up a good enough group of individuals to beat our group of individuals. I often wonder if we will have enough sense to learn when we finally get our butts kicked because we refused to use common sense and send our best pro basketball team of Americans instead of a group of our best athletes. A real team is much more than just a group of athletes.

We need to finally move out of the 19th Century and start selecting functioning teams for team events. This is because it takes years to build the kind of team chemistry you see in the best teams in any sport. That team chemistry improves a team by at least 20% to 30%. It is only a matter of time before some other country realizes this, starts selecting actual teams instead of groups of athletes, and starts beating the US the way the Soviet Union and East Germany did because we did not learn that lesson from them.

Based on these criteria, we can design our objective selection program. I will start with the individual selection program and then discuss the team selection process.

We need to use 5 events for our selection process because it is enough events to show consistency and there are only two possible ways to have a tie. Either two individuals will win two events and one will win one event or five individuals will win one event. The requirement for qualifying will be very simple. The individual who wins the most events will automatically qualify. This shows the ability to win and consistency in winning.

The only time we should consider second place is to break a tie and this would also be a simple process. Since we send two riders for each individual event, if two riders win two events, there won't be a need for a tiebreaker. The two riders who win the two events will be the team and the third rider who wins one event will be the alternate. If five riders win one event each or one wins two and three win one event, then we look to see who got the most second places among the tied riders to show who has the best consistency among the tied riders.

We continue going down in placings until the tie is broken and then we stop. It could not be more simple or objective than that.

For team selection such as in road racing, a team submits its members and list of 3 alternate riders before the first of five events. These events must be similar to the event they will ride at the World's, Pan Am's, or Olympic Games because you don't send sprinters to win a mountain race or climbers to win a flat race that will probably end in a sprint. That should be common sense.

The requirement for the road team should be to put any rider across the line in first place. For the five events, it could be five different riders from the same team. In other words, the selected team and alternates will be the

team that can win the most races using the same tiebreakers as for the individual selection process.

This will provide us with a true team that is used to working as a team, has team chemistry, has all the domestiques, lead-out riders, sprinters, climbers, and team leaders needed for a real team instead of a bunch of individuals. We must move into the future before someone else does and gains the advantage over us. At that point, we will find ourselves chasing other countries again.

Now here is the really innovative part to this program. The coaches and other staff members who helped make these athletes the best will be selected when their athletes are selected. In other words, we use an objective process to select our national coaching staff every year. The staff that is doing the best job that year gets the job that year. That is only common sense.

If you are having an off year, why should we send you to represent the US at international events that year? You earn the right to be a member of the national staff team by doing a better job than anyone else. That only makes sense. The coaches and other staff members should be selected based on performance just like the athletes.

What the coaches will find after a few years of this program, is that earning the position of national coach based on results will greatly increase your earning potential. This will make the coaching industry much more competitive and greatly increase coaching salaries across the board when sponsors learn that their farm/developmental/pro program can earn the right to be the international team for one year. They are going to get involved in cycling in a big way and bid for the best coaches.

Under this program, at least the top 5 to 10 head coaches in the US should be making at least 7 digits per year by the second Olympiad. This will open up many more programs, greatly increase the number of sponsors and the consistency of sponsorships, increase the sponsorship moneys coming into the sport, and increase the number of quality coaches and farm programs across the US.

This will greatly increase the number of athletes in the sport and promote all aspects of cycling including track racing. When coaches and sponsors realize that Men's road racing is very competitive and that it would be easier to get into international events by going into other events such as track or Women's events, this will greatly increase the coaching and sponsorships for those events. The number of tracks in the US could double or more in just one or two Olympiads because companies will consider it worth the investment to build a program which could put their team or riders into the Olympic Games.

For every up side there is a down side and I will discuss handling the worst potential down side for this type of program under my positive incentives program for drug control.

Eliminating the National Coaching Staff

By eliminating the centralized national teams program and coaching staff, we force a new, more competitive, and open international teams and selection process, which is more likely to objectively, select the best athletes and coaches. This will increase the interest in sponsoring cycling programs in the US, make it possible for an athlete who doesn't get along with one coach or staff to take another route to be selected by going to another program, and increase the coach's, staff member's, and athletes' salaries to where they should be.

It removes the unhealthy politics from the selection process. It makes it possible for coaches who can't operate with one group of managers to move to another program and gives that coach the leverage to run his program the way his training and experience tell him is best. It turns the system into the very successful open coaching and teams system that has proven to be so successful in other college and professional sports in the US such as football, basketball, baseball, and track and field. It provides athletes with alternative means of being selected for international events. It brings more money into the sport and increases everyone's salary potentials. It makes it possible for coaches and staff members to also be objectively selected for international events.

It also takes the top coaches out of Colorado Springs, CO and puts them in the field where they belong running their own farm and developmental programs. It provides quality coaching for beginners since they are any teams future stars and will keep more riders in the sport longer. The sport will grow.

Positive Incentives Program

The most serious problem we will face with such a program will be increased pressure from sponsors and managers to win. This pressure can lead coaches and staff members who are not adequately trained in the sports sciences to use drugs to improve athletic performance instead of physiology and psychology. By requiring a minimum education in the sports sciences, we give them the right tools to use to decrease the tendency to use the wrong tools.

But we will need to offer the sponsors another positive marketing opportunity to encourage them to not only not encourage drug use to

improve athletic performance but to also discourage the use of drugs. I must state here that we must maintain the existing negative program of checking athletes for drugs as a control.

The positive incentives program I propose is for the USCF to give annual awards to the sponsors for every year they went drug free. This way, if a team doesn't make it to the Olympic Games, they can still brag about the events they did win and that they have been drug free for so many consecutive years. The more years they have been drug free, the more valuable the bragging rights become.

At about 3 to 5 consecutive years, these bragging rights will become worth the sponsors giving bonuses to the coaches, staff, and athletes for going drug free one more year. We should also encourage this bonus practice. If the members of a team stand to make more money by not using drugs, it will encourage them to try other methods to improve their performance.

By providing coordinated positive and negative incentives programs for drug control, we could decrease drug use by athletes below present levels. I like that.



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Part VII • Chapter Three

Sports Marketing

Sports Marketing

This page is meant to help people have a better understanding of sponsorship because bicycling is what management and marketing people would refer to as a sponsorship driven industry. Therefore, it is very important for you to understand several aspects of sponsorship.

This part of cycling is very important to understand because it has to do with the most significant source of income for the sport. This affects all aspects of cycling up to and including the management of the sport by the governing bodies and race promoters. Please remember that I have a Master of Business Administration (MBA) from Anderson School of Management at the University of New Mexico.

The first and most important thing you have to learn and remember about sponsorship is that the vast majority of businesses do not sponsor cycling teams and events because they like cycling or think it is a really neat sport. This is commonly referred to by them as warm fuzzy feelings and is meaningless to them and used to tell them when you don't know what you are talking about when seeking sponsorship.

They are in business to make money and the way they use their marketing departments to make money is to increase sales or maintain sales. This is commonly referred to as increasing or maintaining market share. The companies attempt to achieve this by advertising and public relations management (commonly referred to as PR management.)

You next have to understand that the marketing departments don't refer to sports sponsorship as advertising because advertising commonly refers to sending a message about a product or company. They refer to sponsorship as PR.

More specifically, sponsorship is referred to as branding exposure, which is a type of PR. This is where the company simply places its name or logo in the best possible location to provide the maximum possible exposure of that name or logo to the largest possible group of their desired market of consumers as often as possible. This is based on the concept that exposure of a company's name or logo increases the probability that the consumer will think of that name or logo when purchasing a product from their industry and be more prone to purchase their product.

The primary reason to sponsor sports events, teams, or athletes is because associating a product or company name with a popular activity, team, or person increases your recall of that name. It is similar to you associating a person's name with another object to increase your ability to remember that name. Basically, it works and marketing departments know it.

You have to understand that when you are trying to sell sponsorship for your team or race, you are selling branding exposure for that business. Therefore, you must sell your sponsorship based on how you will best deliver that branding exposure for your sponsor because you will get your best sponsorship by exposing their name or logo to the most people in their desired market in as favorable light as possible. This means you have become a PR agency working to provide branding exposure for that company.

In order to sell that branding exposure to that company, you must show them how you will provide that branding exposure and to whom. The best

vehicle for you to provide that company with the best possible exposure is through the media. Therefore, the more and better the media exposure you can provide them, the more they will be willing to pay for the branding exposure. Of course, national television exposure or coverage of the races will best increase the quality of branding exposure you can provide. Short of that, you have the printed media such as newspapers and magazines.

Therefore, you must learn to work to maximize the media coverage your team or event will get. The best way to do this is to get as much television coverage as possible for bike races. For the teams, it also becomes a matter of winning as many of the biggest and best covered races since the winner of the event always gets most of the media exposure and provides that team with the best branding exposure for their sponsors.

This means that the media are a significant factor in the growth and development of the sport. This can be handled in two basic ways. First, we need to maximize the tendency for the media to cover our races. We can best do this by (1) making the racing as attractive and impressive as possible to the media and the general public and (2) by establishing and maintaining a letter writing campaign requesting television coverage of bike races.

The best ways we can improve the attractiveness of our sport is through event design and sports organization. One of the most common mistakes I see in cycling is for promoters to run races as far from civilization as possible. The only people who are exposed to the event and its sponsors are the racers and their families. This leaves out the largest group of the desired market for sponsors, which are the general sports fans. In other words, we need to get into the cities and get in the people's faces so they will be more aware of the events and be exposed to the sponsors of the events.

You must remember that out in the sticks, the only spectators are jackrabbits and jackrabbits don't buy anything.

The best way to increase the tendency for the media to cover the sport is to make it the best possible story for the media. You can do this through both event design and sports organization. For a number of years, I did marketing research on what types of events would be most impressive to the general public and media to increase the popularity of the events and their coverage by the media. I consistently found that almost 100% of the time, the events, which inspired the greatest desire for watching by the general public, are city-to-city road races.

This is because we must have some reference points for the start and finish of an event to be able to comprehend the actual distance of a race and the course. Since we drive our cars from one city to another city, the best and easiest reference points for event promotion are to start the event in one city and finish it in another city. I have found that people easily comprehend the course and are most impressed even if the race is only half the distance. This is what made European road racing and the Tour de Dupont so popular. It will work for your races also.

I have also done marketing research concerning how to increase the desire to watch a sporting event and have found that the general public has a much greater respect for and desire to watch a professional event than an amateur event. The general public and media have a special respect for professional athletes because they have made a very special commitment which most people only dream of being able to make. This respect is so significantly greater for pro's by the general public that they will show more respect for a pro who is not as good as a better quality amateur.

This is proven by such minor league sports as in baseball. There are seven different levels of minor league circuits in professional baseball. At least half the pro athletes in the bottom two or three leagues wouldn't be able to make the starting line up on one of the top five or ten college teams in the US. Yet the general public respects them much more than the college athletes because the pros have made a commitment that the college athletes have not made.

I have learned that it is the commitment that demands the respect even more than the ability of the athlete. This is one of many reasons why we need to develop both minor and major league bicycle racing in the US. It will increase the amount of money coming into the sport in a number of different aspects.

Marketing And Management

Therefore, it must be understood whom the businesses are trying to reach with their branding exposure when they sponsor teams, events, and governing bodies. This is very important, because it is the most missed concept in bicycle racing and, if every one understood this, their attitudes about racers and the fans would change. This would be especially true for the governing bodies, race officials, and race promoters.

The primary markets the sponsoring businesses are attempting to reach are the athletes, their families, and the racing fans. They are not sponsoring cycling to reach the governing bodies, help run races, or because they think cycling is a neat sport to sponsor. A serious misconception among many officials, race promoters, and the staff members of governing bodies that the reason for businesses sponsoring cycling is because they are a really great governing body or their event is a really great event. This could not be further from the truth.

The ONLY thing these businesses are concerned about is how many of their desired customers are they getting their name in front of in a positive manner.

It should only be common sense that, if the companies primary customers are the athletes, their families, and the fans, then the officials, promoters, and governing bodies primary customers are the sponsors' desired market and not the sponsors themselves or the race promoters. Since the governing bodies and race promoters are dependent on the sponsors, they must learn to realize their primary concern should be to provide the best quality service to their sponsor's desired customers in order to keep the sponsors coming back. This means making bike racing as enjoyable as possible for the athletes who will in turn make the sport as enjoyable as possible for their families and the fans.

The USCF has failed to realize this and is now paying the price. They had begun to believe that the reason the sponsors where sponsoring the USCF was because they were the controlling body for an Olympic sport through which all potential participants had to be licensed.

The USCF decided to ignore the general masses and put all their energy and most of their money into promoting upper level cycling and not meeting the needs of the majority of their licensed riders and the sport in general. They believed that they had a monopoly because, in order to compete in the Olympic Games, Pan Am Games, and World Championships, you had to go through the USCF. What they failed to realize is that most racers either never had any intention of trying to compete in these events or quickly gave up on competing in these events especially when the USCF permitted their national coaching staff to politicize the selection process and all that these riders want now is reasonable quality and fair local to regional racing.

Less than 20% of the bike racers in the US have even the slightest dream of making the US Olympic Team and the rest only want to have some fair and fun bike racing. Those who do want to try for the Olympic Team want a fair and reasonably unbiased opportunity to make the team.

Because of the USCF's failure to meet these needs, many of the racers and their clubs have formed local to regional governing bodies to meet these needs. The membership and potential exposure for the USCF sponsors has dropped and now the sponsors either don't want to sponsor the USCF or will pay less for that sponsorship because many of the clients they want to reach are no longer being served by the USCF.

It is also interesting that the cycling fans go where the racers go and not where the USCF goes. The USCF is finally finding out that the fans show up to watch the racers race and not to watch the officials officiate, the promoters promote, or the USCF govern. Where these fans go, the sponsors will also go. If the racers learn this, they can develop more say in how the races and their governing body will be run.

Interestingly, the USCF, in spite of the fact that it is being run by business people, still fails to get the big picture. They recently have begun trying to buy up these small governing bodies in an effort to force the riders back into their membership. What, do they think these disgruntled racers can't turn around and form new governing bodies to provide those services, AGAIN?

What the governing bodies, all too often, have failed to realize is that governing bicycle racing in the US is no longer their monopoly and they are now in competition with other governing bodies. What they should be doing is competing for these clients by providing better services for the racers.

It is just common sense business, that, if you provide the racers with a better service, they will choose your governing body over the other governing bodies. But so many of the people running these governing bodies are so obsessed with the power and control of the governing bodies that they refuse to admit that they are in competition for the clients called bike racers and the fans who show up to watch them race. What the racers need to do is unite and stress that they will go where the better racing services are provided. This will force the governing bodies to begin competing for the racers by providing them with better services.

It should also be realized that the governing body which first realizes this, begins to compete for these clients we call racers, and does the best job of providing the best quality racing services will have the best long term potential of being the national governing body for the sport of bike racing. At this point, one wants to say to these governing bodies, "Duh, hello! Anybody home?"



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Part VII • Chapter Four

Sports Management

Sports Management

There are a number of hats the 21st Century sports manager must wear. These include business management, marketing, public relations, and sports management. I will address all of these in this chapter.

Business Management

A good sports manager has to be a good business manager dealing with financial management, accounting, inventory management, and logistics management. As a sports manager, you are also a business manager running a business. Most amateur teams are nonprofit corporations but most professional teams are profit-bearing businesses.

You have to deal with contracts and negotiations, staff hiring and management, office management, and the other tasks of being a general business manager. You will have to deal with city, county, state, and federal laws and requirements. There will have to be an office with office equipment, supplies, and overhead costs like rent and utilities.

You will also have to deal with the financial and budget management. This will be one of your most important jobs. The sponsors are very concerned in this area since sports projects often don't fulfill their contracts because of financial mismanagement. I have seen teams run out of money as early as in the first third of the season. This is the worst nightmare for the sponsors because the money is gone, the manager and team are broke, and they

won't get their full season of exposure they paid for. Therefore, budget management is a major concern for any sports manager.

Note: One thing that all top sponsors require in a well-designed sports program budget is a contingency fund of 15% of your total budget. This fund is an emergency fund for things, which cannot be anticipated such as broken, lost, or stolen equipment and vehicles. You have to understand that the sponsors would rather pay a little more to make sure a good program will complete the season than to spend a little less money and get nothing.

Sports management is project management where you must have everything you need up front and make it last through the entire season. This is difficult to do and requires outstanding budget design and management for both cash and other equipment. The basic rule here is that it is always better to have some left over at the end of the season than to come up short for just one event.

One thing, which can help a manager with a large budget maximize his budget potential, is a good cash management program. In such a program, the manager will set up the budget to make sure he gets enough of his money from the sponsors early enough to set up a good cash management program with a top level bank.

The manager and bank will work together to invest any money's not being spent on any day into a "sweep account" to earn extra money for the team extending the amount of money available for the team during the season beyond the budget and increasing the PR and operations potentials for the team. If you have at least a few hundred thousand dollars in sponsorships, check with a major bank in getting help with a budget design and development, which will make it possible to use a good cash management system.

Inventory development and management is also important. You have to first figure out how much equipment you can get and how to properly use or ration it so that you will be able to complete the season with something other than junk. You must inventory your sponsored and purchased equipment, manage the inventory, and make sure it is reasonably secure. You can't come up short on inventory.

A good sports manager is also a good logistics manager. You have to take care of all the logistics required for traveling to, staying at, and returning from each and every event. This can involve transportation, vehicle management, lodging, meals, extra food for feeds and during travel, equipment replacement on the road, travel coordination at the event with the cooperation and consent of the coach, and finding entertainment for the staff and athletes.

A common practice here is to set up road trips to cover racers at any distance more than about 500 miles away from home base. This limits the travel time between races and makes it easier for the riders to train on the road. It is not unusual for a pro team in the US to stay on the road in one trip for three months or longer. To do this, you must have a system such as having an office with an office manager or secretary to UPS or FedEx packages of equipment such as extra water bottles, musettes, jerseys, and tires ahead of you to motels. The motels will hold the equipment behind the desk or place it in your room for you.

Marketing

The marketing requirements for a sports project involve developing a sales prospectus and selling the sponsorships required to support the project. In doing this, you must forget "warm fuzzy feelings" about the sport being good and it being healthy. You must focus on the Public Relations benefits and potentials for the sponsors. Always ask yourself what will the sponsors

get out of this sponsorship which will help them maintain or increase the market share for their product or services. Also remember that the marketing exposure you are providing is commonly referred to by business men and women as "branding exposure".

Another hint here is to not even mention the exposure the sponsors will get on the street from the riders training. You must focus on obtaining press for the project, which will expose the name of the sponsor(s) to the general public. This is what they are paying you for. The value of your project is determined by the number of people who see or read about your event or your team at the races.

Your job with the sponsors has only begun when you sign the sponsorship contracts. You must also maintain a good relationship with the sponsors to make sure they are happy with your services or they will take their business elsewhere next year. This often can include little things like providing them with a team jacket or jersey, pictures, and regular team updates in spite of the fact that the biggest corporations have their own news and sports media monitoring center which scans all media for references to their business and any of their sponsored projects.

Public Relations

Public relations will be one of your main jobs throughout the season. One of the first things you must do is get team pictures and put together a press kit. When I was coaching, I handed our press kit to race announcers at races with top pro teams only to get a curious look and, "What is this?" I found out very quickly that NONE of the top pro teams in the US had a press kit for event announcers and the media.

This is very important because the press kit is designed to provide key information for the media and announcers to help them put together stories

about your team or project. I remember being at races where our team had a bad day, missed the winning break, and we got almost all the announcer chatter about our team because we were the only team which provided that announcer with a press kit. Announcers love press kits because it gives them information to talk about during the race and helps him keep the crowd entertained.

A good press kit for radio and race announcers will have a one page racing history for each racer and staff member on the team and at the event including his most significant wins and placings plus some personal information like where the rider is from, do they have family, and a few interesting but trivial things. There should also be a one-page item about the sponsors and the team. For television and the printed media, add pictures of each rider, staff member, and the team with the team vehicles.

You should also be prepared to work with the sponsors to setup and manage PR events like autographing pictures and having key persons on radio talk shows. You need to go out of your way to provide exposure for the sponsors so they will want to sponsor you next year. It is much easier to retain a sponsor than to land a new one.

You must also work on image management with such things as making sure the team looks like a team when making public appearances at events even when dining out. You need to have regular meetings or clinics about how to behave when representing the team and being interviewed. Be sure to train your riders and staff to talk about the team using the sponsors' names and always thank the sponsors. Watch the professional car drivers on television when they are interview and do what they do most of the time. If you are pro's, act like it.

Sports Management

One of the biggest problems we have had in sports is very wealthy and successful businessmen with over sized egos coming into sports beating on their chests boasting, "I'm going to learn you boys how to do this right." In 100% of the cases I have seen or read about this phenomenon over the last 35 years, they have left the sports world much more quietly making excuses for their failure.

In business management, they have learned that there is industry specific knowledge or information a person must know in order to successfully manage any business within that industry. Yet these business people come into the sports INDUSTRY without doing any marketing research or industry studies telling us we are all doing it wrong. If I were to go into their industry or business behaving the way they behave coming into our industry, they would throw me out of their offices for being unprofessional and foolish.

Then, why do they behave that way or unprofessionally coming into the sports industry? Because of a society attitude about sports and male ego. You see much of society has the attitude that the only reason people go into sports management or coaching is because we are too stupid to do anything else. Therefore, if we are stupid and are still successful at this game, an intelligent person should have no problem being successful. Add to this the attitude that, "I have watched or participated in sports and, therefore, being a man, know all about sports." This attitude assumes that knowing about sports is genetic and all men should have that genetic trait. Guess again.

I remember one such multimillionaire running a big stage race in Southern California after boasting about how he would "learn us to do it right". We showed up to the third annual running of his stage race and he didn't even have a staging area for the teams to setup for the race. The closest parking to the starting line where the teams could stage our riders was in his way for

setting up the start/finish area. Suddenly, this individual was in the middle of the street screaming that, if we didn't move our teams, he was going to cancel the event. He didn't run a fourth event and left the sport making excuses for not "having learned us better."

There is a lot of industry specific knowledge for running any sports project. One of the first and most important things you have to understand is that you are not dealing with the regular and relatively sedate nine to five workers you find in regular business. These people, including the staff, are self motivated to perfection and highly strung. You must spend less time motivating a pro and more time controlling his direction or holding him back.

One of the most common mistakes in team management is the idea of maximizing exposure for the sponsors by making the team ride as many events as possible. This concept is built around the false assumption that you get better exposure by being in more events. This is the flawed idea of more is better being used in management. It is a simple-minded numbers game, which is out of touch with reality.

This problem has gotten so out of hand in Europe that many riders are being forced to ride from 150 to 200 races a year. When you realize that a number of races are stage races and tours, then you realize these riders are racing daily and, sometimes, twice a day. This is why new riders entering the European circuit often overtrain and go flat very quickly. Exercise physiologists have been stating for years that all European racers are overtrained.

Greg LeMond and Lance Armstrong have defied this marketing strategy by building their seasons the way I show you. They don't ride a race every day and don't ride every race with the primary purpose of winning. This is why they have been so dominant in winning the Tour de France.

When dealing with this marketing strategy and the sponsors, you must ask yourself and the sponsors which will get you better exposure for your sponsors, to win fewer races and get a lot of good press or to lose more races and get much less press? Always remember that, as far as marketing and public relations are concerned, one team wins and everybody else ties for last. This is because second place never gets his picture on the front of magazines and newspapers or on television and rarely gets it inside of magazines and newspapers. People don't like to cheer on and read about losers and second place is just the first rider to lose.

Now, if your riders are not as physically AND mentally fresh going into a top race as their competition because they have been riding too many races, who is most likely to win and get the good press for the sponsors, your team or theirs?

Most people don't realize how important sports psychology is for winning in sports. I have recently been watching the end-of-season US football games and it is amazing how many teams which were out of the running for the playoffs have been told over the last few weeks by their coaches that they might as well just go out and play for fun. Suddenly these teams, which have been among the worst in the nation, are not under the stress and pressure of making the playoffs and can relax and just enjoy playing for the love of the game. It is amazing how many of these teams have beat better teams in the closing of the season. It works.

It is clearly not that they were not physically able to win, but that they were not mentally able to win. If your riders minds are burned out from riding too many races, they will not have as good of a chance of winning against the best in the world and your sponsors wont get as much quality press. Always remember that better is better. MORE IS ALMOST NEVER BETTER!!! I have learned that there are very few exceptions to this rule.

Therefore, sports team management requires that the physical and mental aspects of the athlete be included in all decision-making concerning those athletes and their performance and regular business people don't understand this. These business people are used to managing things like a fleet of cars where you can run them at full speed until they break, replace the broken parts, and keep pushing them until they break again. Human beings are not cars and can't be managed in the same way especially when they must put out 100% every time they show up for work. Their bodies and minds must have rest so they can rebuild and get better.

I used these principles in my coaching and team management and they work fantastically. Because of my training in coaching, the sports sciences, and sports management, I knew about and how to use these methods. It kept my teams fresh and winning throughout the season. I build my riders' seasons by using the concept I teach in this book under the chapter "Calendar."

You have to pick the top three to five racers which you feel your team can win or do well enough in to get the best press for your sponsors as the primary focus for the season, select the next most significant races you want to win knowing that winning these events CANNOT interfere with the potential of winning your "A" races, and build the rest of the season around those races as part of the training for those races.

This is what both LeMond and Armstrong have done and it really works. They put all their primary focus on the Tour de France and everything else was secondary or less. They regularly beat the teams whose managers over raced them to get "more exposure." And who got the most exposure for their sponsors, Lemond and Armstrong or the other teams? Notice, also, that LeMond and Armstrong have been able to get better press without using the drugs that the burned out riders have to use to keep performing at the lower level. Think about it, it works.

It is because of this that a great team manager will work closely with his coach in developing the team-racing calendar to maximize the PR potential for the team. I also feel it would be very beneficial if a sports manager had a business degree but also had at least a minor in coaching or sports management. It would make it easier for the sports manager to understand and explain these things to the team sponsors.

The racing schedule is the most important part of a good training program. In looking over the Cantrell Training System CD which comes with this book, you will notice that, under the training calendar program, I have you build your racing calendar first and then build your training program around the racing calendar. I do this to (1) make sure you have a properly designed racing calendar and (2) make sure you train right. I do exactly the same thing when I program athletes. It works.

One of the biggest mistakes made by team managers and owners in all sports is to hire a coach for the team and then tell the coach how he can and cannot coach restricting his coaching and tying his hands. If you think you know better how to coach than the coach does, why did you hire him?

Why are YOU not the coach? The answer should be obvious, because the coach is the coach and you are only the manager or owner. The coach is hired because he KNOWS how to coach and you are the manager because you know how to manage. But you clearly don't know how to manage a team if you don't let the coach do his job the way he knows is best and, therefore, if you don't let the coach coach, you should be the one who gets fired.

Not permitting the coach to coach his way is like tying up your guard dog when someone attacks you so the dog can't protect you and you running

over to bite your attacker yourself. It is stupid, to say the least. Let the man do his job or don't hire him and do it yourself.

Unfortunately, for the coach, this often destroys the coach's career because the manager's bad coaching forced on the coach and the team makes the coach look really bad. Because of this, a coach has to include it in his contract that he must be permitted to coach the program the way he knows is best or don't sign the contract. You must stand up for yourself and protect yourself.

The way to handle this, as a manager, is to let the coach do his job and, if he is lousy, fire him at the end of the season and hire another coach. After all, hiring and firing the coach is the manager's job; coaching the team is not your job. You do your job and he does his.

This should tell you that it is important to have a job description for everyone you hire including the racers and yourself and that job description needs to be read to the employee before they accept the job so they can't say, "I didn't know this was what you wanted me to do." Now I hope you know that you AND the coach should work together to write the individual job descriptions for each rider you hire because the coach will know best exactly what HE will expect and require from each rider he hires. After all, he knows why he hired that rider and what he wanted the rider to do.

The event manager faces similar problems. He doesn't have to deal with the athlete from the perspective of the coach but more from the perspective of need in relation to the play characteristics of the sport. He needs to know the sport and needs of the athletes and teams well enough to do his job right. The failure to do this is one of the most common mistakes in event management.

Above, I gave an example of a business manager not meeting the needs of the teams by not providing a staging area for the teams before and following the race. Other problems faced by event managers include designing event formats without really understanding the strategic and tactical thinking of the top athletes.

For example, in California, a promoter wanted to maximize spectator interest by discouraging early breaks by not giving primes to riders on break until half way through the race. He thought the crowd would get more from a race where the primes were all contested by the entire peloton. What he did was almost completely shut down the normal team tactics used to evolve the peloton.

Unfortunately, the truth here is that this is sometimes necessary because the race announcers either don't or can't read the developing race tactics to the crowd the way television broadcasters do for sports like football, baseball, and basketball. Therefore, the crowd doesn't learn what is going on and developing in the race and can't really get mentally into the event.

We learned in college that the first and most important thing for enjoying a sport or event is to have enough knowledge about the sport or event to be able to understand and follow the play action. If you don't understand it, you can't enjoy it.

I have only seen a few announcers who could do even a decent job of calling the tactics as they develop. Don't tell me this can't be done because I did it at races while coaching and have announced several races where spectators came to me afterward excitedly telling me that they had learned more about bike racing watching me announce one race than they had learned in from 10 to over 15 years of racing.

When I was coaching criteriums, I would be on the backside calling up instructions to my riders and, when the pack had left, spectators in the area would begin asking me questions about the race. I would answer their questions and teach them what to look for and what it meant so they could read the action in a race. It wouldn't take long for me to be surrounded by a crowd listening to me telling them about the tactics being used and what the different teams were trying to do when they could have gone around the corner or down the block and listen to the race announcer.

It should be obvious that one of the most important jobs for a promoter is to hire a race announcer who can get the people tactically involved in the event and keep them there. Unfortunately, there are not many people like me who are good at both reading and talking the race action as it develops.

Sports promotion is one of the most important jobs of any sports manager whether you are a team manager or event manager. Everyone in cycling I have seen, heard, or read has made the same mistake. They think that the sponsors are their most important clients because they get their money directly from the sponsors.

This is wrong. The most important clients for every sports manager and athlete is the spectator. Without the spectators wanting to see your thing, the sponsors won't pay you to do your thing. The event manager's real job is to put on the best show possible for his fans to maximize the number of people who will want to see the event and, therefore, maximize the sponsorship for the event.

The team manager's job is to put on the best show possible with his team to maximize fan interest in his team so he can maximize sponsorships for the team. Like it or not, you are in the show business when you are in sponsored sports.

Therefore, it should only be common sense that we all need to work towards promoting our sport. I have learned that, if you give back to your sport so that it grows, it can take much better care of you. If all you do is take from your sport, then you are stealing from your future.

Event managers need to also know that the athletes and teams are they second most important clients because, without the athletes and teams, you wont get the fans or the sponsors. You must do your best when taking care of the athletes.

This is especially true when you realize that events are competing with each other and other sports for those athletes. You must take care of them. I have never seen a large crowd show up at a well-designed sporting event that doesn't have athletes to watch.

What are they going to watch, the officials officiate?



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Part VIII • Chapter One

Training Calendar & Instructions

Training Calendar

The training calendar is used to post the basic workout and duration for each day of the week and month along with any races or training rides.

You post the workouts and on that day and then go to the Training Instructions to see what the specific instructions are for that type of workout. This is designed to provide you with a quick reference picture of your training program and make it easier to properly develop the training program.

The best way to set up a program is to start by building your event calendar or placing the events on your calendar. Next, you add in days off followed by easy days. This is to make sure that you have a properly designed set of rest cycles to be sure you will not overtrain and will be properly rested for and from your events. Next, you fill in the rest of your workout where there are holes in your rest cycle. If you do this right, you won't overtrain.

Calendar Instructions

For the example on the next page, Freddy first put the Cantrell Road Race on the 8th. Next, he put in the off day to make sure that it is not the day before a race or his legs will be stiff for the race.

Then he would add in the easy to moderate days so that he will have at least one easy or moderate day between each hard workout day. Next, he would balance out his program by filling in days for flat work, hill work, or any

other specific workout. And finally, he would check out his calendar to make sure he has not violated any training rules in this book.

On the next page is a blank calendar you can print out and use or you can use a wall calendar with enough room to fill in the workouts. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information.

Fast Freddy October Example

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 Flat 100 miles	2 Easy 10 – 20 miles	3 Flat 35 miles	4 Easy 10 – 20 miles	5 Hills 45 miles	6 Easy 10 – 20 miles	7 Easy 10 – 20 miles
8 Cantrell Road Race 100 miles	9 Easy 10 – 20 miles	10 Run 5 M Swim 10 laps	11 Moderate 20 – 40 miles	12	13 Off – No Training	14 Easy 10 – 20 miles

Training Instructions

You should post your training instructions for each day and specific workouts, especially if you have a coach. This way you'll have a quick reference before your workout. To write your own specific training instructions, please read all my chapters under Part III, Training, especially the chapter on Weekly Training.

Training Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Part VIII • Chapter Two

Training Log

Training Log

This is a basic training log where you put in the information for each day of the week. You simply fill in any information that you and your coach feel is necessary. The main thing here is to put in any information, which may help you identify any good, or bad trends while helping you determine why.

On the next page is a blank training log you can print out and use. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information.

Sample Training Log

June 2003					
Day	Date	Course & Ride Details/Results & Recovery	A-Spd	Miles	
HR	Time		T-Spd	Time	
Mon	06/02	Easy day. Warm up and go home.	15.1	15	
42	8AM		18.0	1:12:00	
Recovery Information					
Tues	06/03	Cantrell 100KM Road Race - Leg's warmed up very nice, did about three hard attacks and helped chase breaks, tried for two primes and legs felt good sprinting, finished about fifth in the final sprint. Got a great workout, legs felt great attacking and my recovery was very good between attacks and sprints. I did well chasing with long hard pulls. Got an excellent workout.	22.1	62.4	
41	7:30AM		39.6	2:44:53	
Recovery Information		I was a little tired at night and slept well. My legs felt like they had a good workout but were not really tired before bed. There was a little stiffness in my left calf. I had well-balanced meals with dessert and hydrated properly.			

Training Log

Month _____ Year _____				
Day	Date	Course & Ride Details/Results & Recovery	A-Spd	Miles
HR	Time		T-Spd	Time
Mon				
Recovery Information				
Tues				
Recovery Information				
Wed				
Recovery Information				
Thur				
Recovery Information				
Fri				
Recovery Information				
Sat				
Recovery Information				
Sun				
Recovery Information				

Part VIII • Chapter Three

Managing Events

Managing Events

On the following pages are a number of charts and ideas you can use to manage your competitive or recreational events.

Events Calendar

You can use this form to set up and manage your events calendar. You first fill in the events and any important information such as starting time. Then you can add items like the last day to mail the entry form, when to meet other riders to travel to the race, and anything else that will be important for getting ready for the race. This is to provide a quick reference for anything you need to do to prepare for an event make sure you don't forget things. For more specific information, you refer to the Event Log below.

Sample Events Calendar

March 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Send in entry form	3	4 Tune up bike for race	5	6 Go to bank for money – pack bags	7 Leave for race with Ted and Tom
8 Cantrell Road Race 100 KM 7AM Start	9	10	11	12 Tune up bike	13 Get ride money	14
15 Cantrell Century	16	17	18	19	20	21

Event Checklist

Over the years I've found it very useful to make a before and after race or tour checklist. It's designed to help you not forget to take anything to the event or bring anything back from the event.

You fill in the items you are taking, print the check list out, check the items off when they are loaded into the car to go to the event, and check them off again as they are loaded into the car when returning from the event. Don't forget the Check List!

There is a full sized checklist at the end of this chapter. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information.

Sample Event Checklist

Checklist		
Item Taken	Taken	Returned
Helmet	X	X
Shoes	X	X
Bike	X	X
Bike Stand	X	X

Event Chart

This is designed so you can record race results for a quick reference on performance and will make it is easier to see performance trends.

When you identify a trend, you refer to the Event Log below to get more detailed information. The evaluation should be your personal evaluation of your performance on a scale of 1 to 10 with 10 being highest. You will also be able to chart your performance in the Performance Graphs chapter.

There is a full sized chart at the end of this chapter. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information.

Sample Event Chart

Event Chart					
Date	Event Name	Event Type	Class Cat	Results	Evaluation
07/01/03	Carl's Crit	Road Crit	4	2 nd	8
07/22/03	Cantrell Road Race	Road Race	4	Last	1

Event Log

The Event Log is designed to provide you with specific information about an event both before and after the event and can be used by a team to help set up strategy for an event the following year. It's best to start your event log for an event as soon as you get basic information and finish filling it out following the event.

You and your team can use some information before and going to the event. The rest of the information can be used to help you better prepare for the event next year such as developing tactics. With the Event Log, you don't forget important things about the event for next year.

For example, Freddy got dropped because he was not ready for the bad corner at the bottom of the hill. If he reviews this log before next year's event, he will remember the bad corner.

There is a full sized event log at the end of this chapter. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information.

See sample event log on the next page.

Sample Event Log

Event Log			
Event	Carl's Crit	Day/Date	Saturday 07/15/03
Event Format	Scratch Road Race		
Location	Hwy 5 & Rte 7	Mailing Address	210 Tumble Weed Rd Out In The Woods, NM 88888
Contact Person	Carl Cantrell	Contact Phone eMail	555-555-5555 carl@carlscrit.com
Expected Weather	95 degrees, wind – 30 mph, dry	Actual	70 degrees, no wind – rain
Travel Directions	Hwy 5 to state rd 103, go 5 miles to outhouse then turn right		
Housing & Meal Notes	Motel 13, lots of bugs, try motel 7.5 next time Meals: Maria's Restaurant, good food at good prices		
Course Description	75 miles out and back, good two lane roads with nice turn around, hard climb going both ways, winning break went on this climb on way back last year. One bad corner at bottom of downhill returning. Uphill finish.		
Tactic Used and Results	Team Fred tried early break but was caught before the turn around, Team kick My Butt rode defensively and was not anywhere at the finish, We used a control break and got Tommy and I in a break on the second climb. I missed the bad corner at the bottom of the hill coming back, crashed, got dropped, and finished last. Tommy got second in the break sprint.		
Race Feed Zones	There was a nice feed zone on the hill going both ways. Feed at the top is best.		
Suggestions for Next Year	Get a lead out rider in the winning break. Watch out for the corner and work on cornering. Take more water and food at the first feed.		

Events Calendar

March 2003						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Event Checklist

[illegible]

Event Chart

[illegible]

Event Log

Event Log			
Event		Day/Date	
Event Format			
Location		Mailing Address	
Contact Person		Contact Phone eMail	
Expected Weather		Actual	
Travel Directions			
Housing & Meal Notes			
Course Description			
Tactic Used and Results			
Race Feed Zones			
Suggestions for Next Year			

Part VIII • Chapter Four

Performance Graphs

Performance Graphs

Included with your eBook download are two Excel Files with interactive performance graphs that you can use to enter and track your performance. Complete instructions for how to use the Excel graphs are at the end of this chapter.

Naturally, you'll need Excel installed on your computer to use these. Most computers have Excel already installed and I highly recommend that you take advantage of these training tools in Excel.

For those of you that don't have Excel, you can make your own graphs by using the instructions below with some inexpensive graph paper from any office supply store.

Cantrell Action/Reaction Graph

This graph is designed to give you a picture of your body's reaction to your training action based on resting heart rate. Below is an overview of how the chart works. You can create your own manual chart by following these instructions.

Days of Month

First, put in the days of the month across the bottom of the graph. You want to start on the left with the first day of the month and finish on the right with the last day of the month. Then split the chart in half so that Resting

Heart Rate makes up the top half of your chart and Duration makes up the bottom half.

Resting Heart Rate

Along the top left, you enter in heart rates that will be your lowest rate, which is your resting heart rate taken before you get out of bed each morning, at the bottom increasing up towards the top. For example, let's say that your minimum resting heart rate is 34 beats per minute. Just put the 34 at the bottom location and go up one beat for each location until we reach the top. Remember this is done automatically in Excel.

Duration

Along the lower left, you enter in the distance or time units you use for training starting at the bottom with zero.

For example, let's say your longest ride is 100-miles. You would start at the bottom with zero and add in miles in increments of 5 to 10. If you track your rides by kilometers, just use KM. If you like to go by time, use minutes.

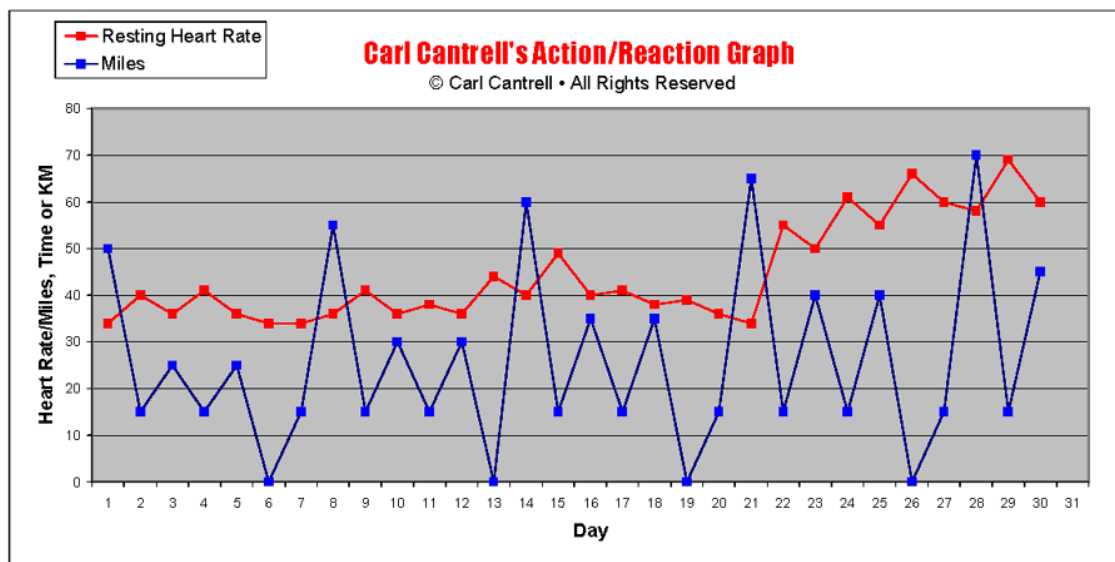
As the graph develops and you add more information, you won't be looking for a change on any one day but will be watching for a pattern showing that you are recovering, progressing, or overtraining. These patterns could last anywhere from a few days to weeks.

When you identify an increasing or decreasing pattern on this graph, you would study your training log from a few days up to a few months before this pattern began to develop and compare it to the graph to help you determine what caused this pattern to develop.

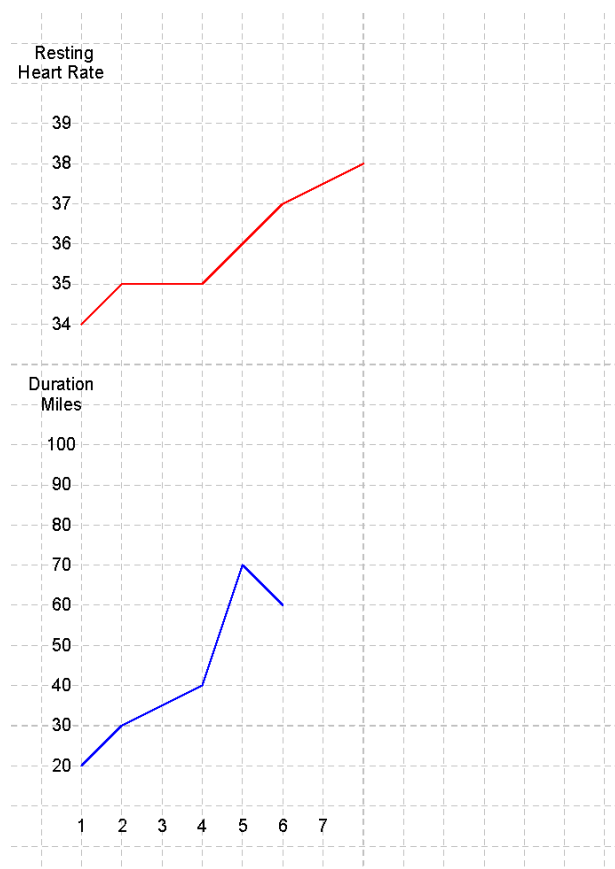
This makes it very easy to compare resting heart rates, which when increasing will usually indicate overtraining, to the ride distances and rest days.

Sample Action/Reaction Graph (Excel)

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Resting Heart Rate	34	40	36	41	36	34	34	36	41	36	38	36	44	40	49	40	41	38	39	36	34	55	50	61	55	66	60	58	69	60	
Miles	50	15	25	15	25	0	15	55	15	30	15	30	0	60	15	35	15	35	0	15	65	15	40	15	40	0	15	70	15	45	



Sample Action/Reaction Graph (Manual – First 7-Days)



Event Graph

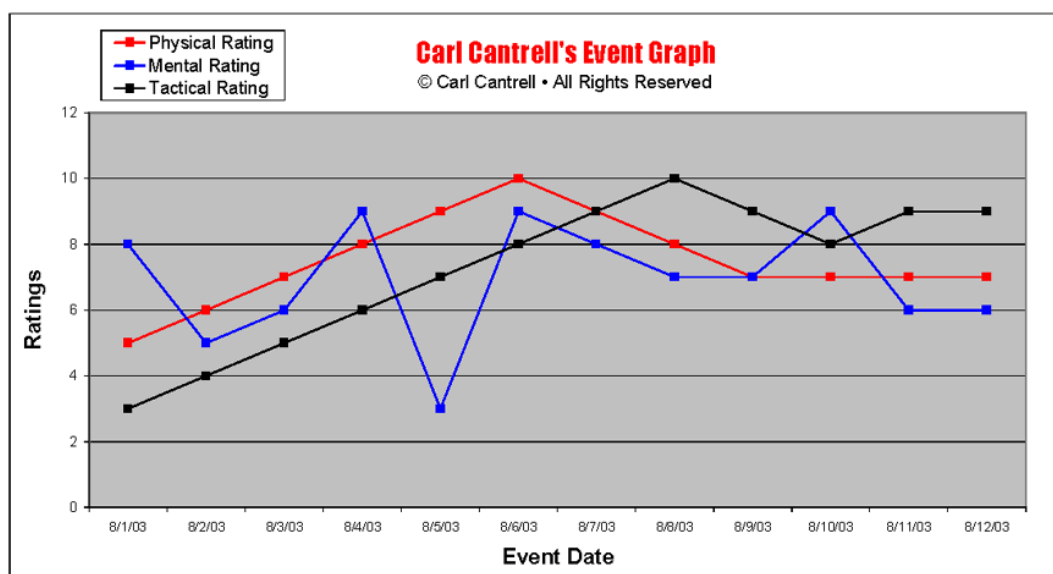
The Event Graph is designed for a quick reference and to provide a picture look at your performance for races evaluating your physical, mental, and tactical performances on a scale of one to ten with ten being highest. This is meant to help you identify which areas you need to work on most.

Just use your best judgment and honest assessment of how you felt during the event to plot the graph.

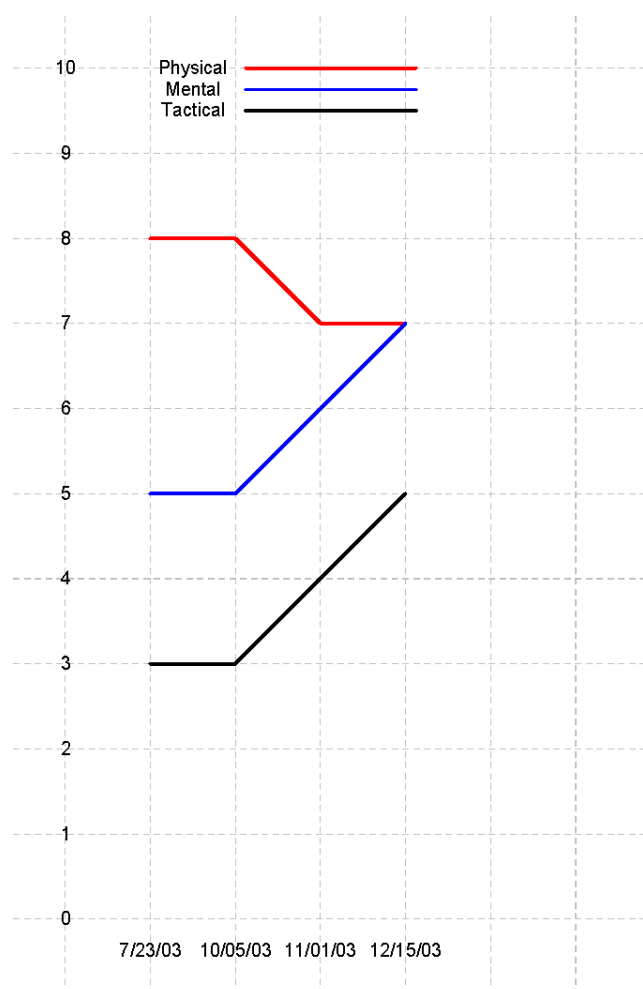
Again, you are looking for trends and when you identify a trend, you can check with your racing and training logs for more details. For example, you may be consistently lowest on the mental evaluation and may need to work on focus or confidence. You can check your racing and training logs to help identify what may be causing the problem.

Sample Event Graph (Excel)

Event Date	8/1/03	8/2/03	8/3/03	8/4/03	8/5/03	8/6/03	8/7/03	8/8/03	8/9/03	8/10/03	8/11/03	8/12/03
Event Name	Carl's Crit	Cantrell RR	Waco Century									
Physical Rating	5	6	7	8	9	10	9	8	7	7	7	7
Mental Rating	8	5	6	9	3	9	8	7	7	9	6	6
Tactical Rating	3	4	5	6	7	8	9	10	9	8	9	9



Sample Event Graph (Manual – First Four Events)



Excel Instructions

You will be using the same values as explained above for each of the graphs, except that the Excel program will plot the graph automatically.

When you open the file, notice that there are tabs on the bottom for each month beginning with January, with the month of January completed as a sample you can practice with. To change the values, just click inside the field that you want to change and type in the new value. You can 'zero out' the graph by clicking in any box and selecting delete.

Once you see how the program works, you should start your personal graph with the month you are currently in by selecting the appropriate tab. When you've completed the current month, just click on the tab associated with the next month and keep going.

You can then compare months by just selecting the tab for the month you want to look at.

In the Action/Reaction graph, you can change miles to either kilometers (KM) or to time by typing in the new name in the box. The program will change the graph name automatically.

To print the graph only, click inside the graph so that it is highlighted or outlined. You can do a print preview to see what you are going to get. To print the graph with the values you've entered above like the samples in this chapter, click anywhere outside of the graph. Again, you can select print preview to see what will actually print out. Either way, you'll need to print in landscape instead of portrait to see the entire graph.

Once you've completed your year, do a save-as and save the Excel file for the year chosen. Then use the original file for the next year, and so on.

Part VIII • Chapter Five

Clothing Log

Clothing Log

If you're like me and can't remember what you wore at what temperature, especially in the winter, here's an idea for a clothing log. There is a full sized log on the next page you can print out and use. Also included with your eBook download is a Microsoft Word file that includes the training log if you prefer to use it on your computer. The boxes will expand as you type in your information. Just add the temperatures to as low as you normally ride :-)

Sample Clothing Log

Clothing Log			
Notes: If the wind is really blowing, especially out of the north, I usually go one step warmer to account for wind chill. You can experiment with this and add your own notes in this area.			
Temp	Sun	Legs/Hands/Feet	Upper Body
65-67°	Y	Shorts/Knee Warmers	Jersey + Light under layer
	N	Shorts/Knee Warmers	Long Sleeve Jersey + Light under layer
61-64°	Y	Shorts/Knee Warmers	LS Thermal under layer/Jersey
	N	Shorts/Knee Warmers	Long Sleeve Thermal under layer/Jersey Plus wind block on chest or windproof Vest
56-60°	Y	Shorts/Knee Warmers Regular Gloves	LS Thermal under layer/Jersey + Vest
	N	Shorts/Leg Warmers Wool Gloves	LS Thermal under layer/LS Jersey + Vest (or) Arm warmers with SS Jersey + Thermal under layer + Vest
51-55°	Y	Shorts/Leg Warmers Wool Gloves	LS Thermal under layer + Vest (or) Arm warmers with SS Jersey + Thermal under layer + Vest
	N	Shorts/Thermal fleece tights Wool Gloves and Toe Covers	LS Thermal under layer/LS Jersey + Vest (or) Arm warmers with SS Jersey + Thermal under layer + Vest

Clothing Log

Clothing Log			
Notes:			
Temp	Sun	Legs/Hands/Feet	Upper Body
	Y		
	N		
	Y		
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Part IX • Chapter One

Coach Carl's 'Words of Wisdom'

Coach Carl's 'Words Of Wisdom'

- ⇒ "No chin surfing!!!"
- ⇒ "The best you can be is the best you think you can be."
- ⇒ "When all else fails, ATTACK!"
- ⇒ "If you don't train right, you chase those who do."
- ⇒ "EXPLODE INTO THOSE PEDALS!"
- ⇒ "Ignorance is an empty tool box."
- ⇒ "If you beat the mind, you don't have to beat the body."
- ⇒ "You have to think like a champion to be a champion."
- ⇒ "Loosing is learning, Winning is to have learned."
- ⇒ "One rider wins, everybody else ties for last."
- ⇒ "Pain is in your head, unfortunately, so is your brain."
- ⇒ "Properly developed bicycle road racing is a team sport which uses individual tactics."
- ⇒ "The number one tactic in the world is to get stronger and faster than your competition and crush them."
- ⇒ "Never do your competition's work for them."
- ⇒ "The best defense is to have the BEST offense."
- ⇒ "The three most important things for sprinting are legs speed, leg speed, and leg speed."
- ⇒ "You can't beat somebody you can't stay with."
- ⇒ "Your body can only do what you train it to do."
- ⇒ "Loyalty from your team mates starts with loyalty to your team mates."
- ⇒ "It isn't how many miles you ride but how you ride your miles."
- ⇒ "You can't win races sliding on your faces."
- ⇒ "Quality comes before quantity if you want a quality performance."

- ⇒ "The 3 most important words are I want it, the next 2 most important words are How much."
- ⇒ "Do your speed work or your legs will break and your butt will slam thru the back door like a cannon ball."
- ⇒ "Why would you not want to improve your chances of winning?"
- ⇒ "Where cyclists go to become better cyclists."
- ⇒ "The last one to quit wins."
- ⇒ "Make 'em take every inch they get."
- ⇒ "Always give your competition your best bike race."
- ⇒ "Win or lose, send 'em home knowing you were there."
- ⇒ "If they win, make 'em earn it."
- ⇒ "There are many things which can limit your athletic potential. Don't let your mind be one of them."
- ⇒ "Are you a leader through barriers or a follower through barriers?"
- ⇒ "There are no obstacles, only opportunities to prove how good you really are."
- ⇒ "It is the search for improvement which results in the improvement."
- ⇒ "Where do you limit yourself?"
- ⇒ "To reach the tree tops, you aim for the stars."
- ⇒ "Your strengths are tools you use against your competition. Your weaknesses are tools you give your competition to use against you."
- ⇒ "If you can make someone believe they are beat, then they are beat."
- ⇒ "The greatest failure is the failure to try."
- ⇒ "For better or for worse, you are the sum of the little things you do."
- ⇒ "What you can't do today doesn't have to be what you can't do tomorrow."
- ⇒ "If you can't believe in yourself enough to know you can win, then you better know you're going to lose."
- ⇒ "Don't go to a race to lose."

- ⇒ "If they can't figure out what you are doing, they can't counter it."
 - ⇒ "The best season is a well planned season."
 - ⇒ "If you don't plan to win, then you plan to lose."
 - ⇒ "There is nothing like being the fastest guy in town."
 - ⇒ "Fitness is first, then we talk about everything else."
 - ⇒ "Who is your personal coach?"
 - ⇒ "You can be as good as anyone, they're just as human as you"
 - ⇒ "To achieve the dream, you must live for the dream"
 - ⇒ "You have to ride like a pro to ride with a pro."
 - ⇒ "If you can ride with the pro's, you should be a pro."
 - ⇒ "Dare to Dream!"
 - ⇒ "Refuse to Lose!!!"
 - ⇒ "The more work you do now, the more play you do later."
 - ⇒ "If you can't believe it, then you can't do it."
 - ⇒ "If you know what they know, you can beat them."
 - ⇒ "The best training program is the best racing program with aggressive racing."
 - ⇒ "Stomp Pedals!!!"
 - ⇒ "It is much easier to hurt when you know you can beat them than it is when you know you can't."
 - ⇒ "You will lose more races with your head than you will lose with your legs."
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Part IX • Chapter Two

Glossary

Accordion Effect	The constant opening and closing of gaps between riders in a pace line when one or more riders are riding erratically or changing pace.
Attack	A sudden acceleration to escape one or more riders, to drop riders, to shake up a group of riders, or used for any other tactical purpose.
Banking	The steepest part of a Velodrome where the track turns.
Barf	Can mean to either lose your lunch or to become very fatigued.
Bikie	Any bicyclist.
Blew Up	To become very fatigued usually during intense racing.
Blocking	To slow or impede the forward progress of one or more other riders. To prevent a rider from changing directions or following a team mate.
Bonk	Usually used when becoming hypoglycemic or running out of energy. Also referred to as hitting the wall. Is often used for other forms of exhaustion.
Box or Boxing	To impede the movement of another rider by placing yourself between that rider and the desired direction of movement. It is often done when one or more other riders keep a rider contained within a group or pinned against a curb.

Boxing Match	When two riders become angry and begin exchanging blows or fighting.
Bottom Bracket	Most technically correct when referring to the crank axle, bearings, and cups, which are housed in the hanger of the bicycle. Is sometimes used to refer to the hanger itself.
Break or Breakaway	Can be used as either a noun or verb. As a noun, it is one or more riders who have escaped from the peloton. When used as a verb, it is used to mean an attempt to escape from the peloton.
Break Wind	To ride into the wind while permitting other riders to draft you.
Bridge	Can be used as either a noun or verb. As a verb, it is used to mean an attempt to cross a gap between two or more riders. As a noun, it means the one or more riders attempting to cross a gap between two or more riders.
Chain Ring	The front sprocket on a bicycle.
Chasers	Riders attempting to catch one or more other riders.
Chin Surfing	Generally used for crashing but more specifically used for going over the handlebars and landing on your face.
Circuit Race	A multi-lap event on a course of 2 miles or more.
Clincher	A tire that is held to the rim with a wire bead and holds an inner tube.
Criterium	A multi-lap event on a course of less than 2 miles.
Curb	To position yourself so that you keep a rider pinned against a curb or the side of the road or track.

Derailleur	A mechanical device, which guides or moves the chain between the sprockets.
Devil Take The Hind Most	An event on a Criterium course or Velodrome where the last rider across the line on designated laps is removed from the race until the last 3 riders are left who then race a designated number of laps to determine the winner.
Director Sportif	The manager of a cycling team or event.
Domestique	The workers on the team who ride for one or more other riders to win. The equivalent of the offensive and defensive linemen of bicycle racing.
Drafting	To ride in another rider's slipstream.
Dropouts	The devices at the ends of the forks or stays that the wheels clamp into.
Echelon	A group of riders riding in a side wind so that each rider is down wind of the rider ahead of him causing a diagonal pace line to form.
Endo	A crash where a rider goes over the handlebars. Short for end-over-end.
Feeding	Food and water being handed up to riders, usually from someone standing on the ground.
Feed Zone	An area designated for riders to be fed.
Field	The main pack or peloton.
Field Sprint	A sprint involving the peloton for a prime or the finish of the race.

Flange	The part of the hub where the spokes are attached or pass through.
Flat Track	An early 20th Century term for a Criterium course. They used to also do track racing on "flat tracks" when a Velodrome was not available hence the name.
Flyer	An attack from within the peloton that develops speed before reaching the front of the peloton.
Float	To ease off the pedals just enough to permit your legs to rest while not slowing noticeably.
Force The Pace	To tow the peloton at a relatively high rate of speed. Usually a tactical move to keep the race fast.
Forks	The part of the bicycle frame between which the wheels are held.
Freewheel or Sprockets	The rear sprockets on a bicycle that will ratchet when coasting.
Gap	Can be used as either a noun or verb. As a noun, it is the open distance between two or more riders. As a verb, it is to bridge the gap between two or more riders.
Gate Keeper	A designated rider who keeps other riders out of a pace line who would want to disrupt or slow the pace of the pace line.
General Classification (GC)	The individual standing in a stage race, which is determined by cumulative time.

**Going To
Wheel
or
Getting The
Wheel**

To move into another rider's slipstream.

Hammered

Used to show that aggressive racing has fatigued one or more riders. Is also used to show that one or more riders rode aggressively.

Hammering

The action of riding aggressively.

Hand Sling

A method of transferring speed from one rider to another rider by one rider holding hands with the other rider and throwing him forward.

**Handicap
Race**

An event where riders with faster times from previous events start a given distance behind riders who had slower times in the same events.

Hand Up

To deliver food or water to a cyclist while he is riding by a person not riding a bike. Usually the person handing up is standing on the ground.

**Handle Bar
Fight**

An altercation or fight between two cyclists where they slam shoulders together making it appear as if they are slamming handlebars together. It is cycling's version of body checking but is illegal.

Hanger

The part of the bicycle frame which houses the bottom bracket or crank axle.

Hanging On

Struggling to stay with one or more other riders.

Hill Climb

A short bicycle race up a mountain or significant climb. Usually a mass start event but can be a time trial.

Holding Your Line	Maintaining the normal line for the bicycle either in a straight line or corner. Generally means to not make any abnormal lateral movement.
Hold Wheel	To stay on another rider's wheel.
Honking	Standing up to pedal, particularly while climbing.
Hoods	The part of the brakes between the handle bars and the brake levers.
Hook	To move your rear wheel laterally across another rider's front wheel. It is an illegal move.
Hooks Or Drops	The curved part of road or track handlebars.
Interval Training	A form of training devised to develop recovery by having a number of intense efforts mixed with rest efforts.
Jam	Can be used as either a noun or verb. As a noun, it is the condition of one or more riders maintaining a hard pace. As a verb, it is to force the pace.
Jam Session	A period of time during which the riders relentlessly force the pace.
Jamming	The process of forcing the pace.
Jamming Tool	A cotton wad sewn into track racing shorts for the purpose of performing a seat sling.
Jump	A sudden acceleration meant for an attack or sprint.
Kick	A final burst of speed at the end of a sprint or attack.

Kick Back	Normally used in track racing where the rider applies pressure backwards on his pedals against a fixed gear to slow the bike. Generally used to mean to slow the bike by decreasing forward pressure on the pedals.
Kilo or Kilometer	An individual 1,000 meter or one kilometer time trial.
King of the Mountain (KOM)	A title awarded by points earned from sprints at the tops of significant climbs. Usually in stage racing.
Lead Out	When one rider tows another rider up to speed for either a sprint or attack.
Mass Start	An event where the riders start in a group.
Match Sprint	A short tactical event between two or more riders. Usually on a Velodrome.
Mechanical	When a bicycle has problems with its components or structure or has a puncture during a race.
Measurement Line	The inner most line circling a Velodrome.
Miss-and-out	An event on a Criterium course or Velodrome where the last rider across the line on designated laps is removed from the race until the last 3 riders are left who then race a designated number of laps to determine the winner.
Motor Pacing	Drafting a motorized vehicle.
Mussette	A bag used to hand food and water up to cyclists during a race.

Omnium Race	An event where the winner is determined by points which are earned in a series of short events run during one race session. Usually on a Velodrome.
Pace Line	Two or more riders taking turns working and drafting in order to travel faster.
Points Leader	A title awarded in a stage race that is determined by points awarded for placings in the stages.
Points Race	An event where points are awarded for primes on designated laps. The winner is either determined by points or laps gained with laps gained having priority.
Pole	The bottom racing position on a Velodrome between the pole line and sprinter's line.
Potato Chip A Wheel	When a wheel is damaged so that it bends to a side looking like a potato chip.
Prime (pronounced preem)	A sprint for cash, prizes, and/or points.
Pull	Can be used as either a noun or verb. As a noun, it is the action of towing one or more other riders. As a verb, it usually telling someone else to tow for a while.
Pull Through	The act of riding past one or more other riders to tow for a while.
Pursuit Race	An event on a Velodrome where two riders or teams half a lap apart will chase each other. The winner is either determined by one rider or team catching the other rider or team or the fastest time.

Race Caravan	A line of support and official vehicles following a bicycle road race.
Rear Stays	The rear forks of a bicycle.
Road Race	Generally used as any event held on streets or roads. Specifically used for any event held on roads that is either out-and-back or point to point.
Roadie	Any bicycle road racer or even recreational cyclists who ride on the road.
Scratch	A mass start event where the winner is determined by being the first rider to cross the finish line.
Seat Sling	A method of transferring speed from one rider to another rider by one rider grabbing the other rider by the top back of his racing shorts and throwing him forward. This is usually on a Velodrome and involves using racing shorts which have a cotton wad or "jamming tool" sewn into the top back of the shorts.
Setting Pace	Forcing, maintaining, or slowing the pace at the front of a group of riders. Usually for tactical purposes.
Series Race	A series of road events held over a period of days where points are awarded for placings and the winner is determined by cumulative points. Can sometimes be used for a track racing circuit.
Sew-up Or Tubular	A type of tire that is sewn around the tube and is glued onto a concave rim. Usually made of cotton or silk.
Sitting In	Riding in another rider's slipstream. Can mean that the rider is not taking pulls at the front.

Skip Pedal	To strike a pedal against the course surface on a Velodrome or while cornering on the road. It lifts the rear wheel off the ground and commonly causes crashes.
Slam	To suddenly block or curb another rider.
Sleigh Driving	To sit at the back of a pace line and give instructions to the riders who are working.
Sleigh Riding or Sucking Wheel	Drafting while refusing to take pulls at the front.
Slide Out	When the tires lose traction in a corner causing the wheels to slide out from under the rider resulting in a crash.
Slipstream	The area down wind of a rider where you are protected from the wind and it is easier to ride.
Soft Pedal	To ease off the pedals a little.
Soigneur	A person on a racing team who provides technical support before, during, and after events. Their jobs often include, feeding, cooking, laundry, shopping, preparing food and water for races, and other such chores.
Spin Out	To achieve your maximum rate of leg spin while pedaling.
Sprint Train	Where one or more riders lead out their team sprinter by keeping the pace fast enough that no one else can pass him before the sprint starts.

Sprocket Lock Ring	A lock ring that is screwed onto the rear hub of a track bike to keep the rear or fixed sprocket from screwing off when hard reverse pressure is applied to the rear sprocket with the rider's legs. It should not be used when riding on a track but should be used when riding a fixed gear on the road.
Squirrely	To ride in an erratic and dangerous manner.
Stage Race	A series of events where the winner is determined by cumulative time. There are usually other subtitles such as Points Winner, King of the Mountain, Team GC, and Stage Winners.
Stripping Feed	Taking food or water intended for another rider or team. It is illegal and can get you in a lot of trouble within the peloton.
Switch	To suddenly move laterally.
Take A Flyer	The act of making a sudden attack.
Team Captain	The person on a racing team who calls the team tactics during the race. Is usually also the team leader but can often be an older, more experienced rider.
Team GC	A title earned by cumulative times for a pre-designated number of riders from each team for each event or stage. Usually in a stage race.
Team Leader	The rider the team rides for to win in the most significant events or stage races.
Team Pursuit	An event on a Velodrome where two teams half a lap apart will chase each other. The winner is either determined by one team catching the other team or the fastest time.

Team Time Trial	A timed event where groups of two or more riders work together as teams using the pace line to obtain the fastest time over a given course.
Tempo Riding	One or more riders working at the front of a pack to maintain a high pace.
Time Trial	A timed event where individuals or teams riders compete over a given course for the fastest time.
Toss Cookies Or Throw Chunks	To lose one's lunch, breakfast, or dinner.
Track Stand	To balance on a bicycle while standing still. Usually used as a tactic in matched sprinting on a Velodrome.
Trackie	Any track bicycle racer.
Train	A fast moving paceline.
Trim The Course	To travel the shortest possible distance on a race course by going from the inside of one corner to the inside of the next corner.
Victory Salute Or Salute	Raising one or both arms when crossing the finish line.
Velodrome	An athletic facility that has a banked oval used for bicycle track racing. The surface is normally made of asphalt, concrete, or wood. Short tracks are less than 200 meters, long tracks are longer than 250 meters, the most common omnium track is 200 to 250 meters, and most six-day tracks are 100 to 200 meters. There are three classes of Velodromes with the class being determined by the

completeness of the athletic facility or how many facilities such as showers, lockers, rider meeting rooms, officials' room, and press room are part of the facility. A class one track is for local to regional racing, a class two track is for regional to national racing, and a class three track is for national to international racing.

Zebras

Race Officials



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