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COMPARISON—WHICH IS REALLY FASTER?**



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Roll Model.

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He's the kind of guy your mom warned you about. And he rides the haddies better on the SCRAM circuit. The LeMond TIGER-SSL.

TIGER-SSL

Chop talk? Not when you hear that a contributing writer for Mountain Bike Action called Greg LeMond's titanium prototype "astounding," one of the best bikes he's ever ridden" in the January issue.

With all that praise, you figure LeMond bicycles was onto something big. That they'd market that titanium beauty better than Roll could drive his Harley-Davidson across Route 66, right? Wrong.

Chop wasn't finished. Sure, the titanium prototype was hot. But he wanted something that put goose bumps on your arms and tears in your eyes. A bike that made you head down downers.

Enter an even better TIGER-SSL. If its predecessor was "astounding," this baby will leave you speechless. It's a titanium gem with a stainless steel stay and Koolo Flex Mag 20 hubs. The TIGER-SSL is so cool you should have to sign a waiver just to take it for a test ride. So strange that only Rob Roll could introduce it to a waiting world.

Yeah, Rob Roll, the same guy who created a highway wearing no-lace slacks. Dressed like Red Ross before Glenn M' Ross played his first hole.



You'd be tough on if you rolled with Roll's words.

And wears a silver Norejo bicycle on one wrist and a Koles on the other. (Rolls, it was a prize for winning a big race in Switzerland.)

Want to learn more about Rob Roll? Prepare for nothing you've ever experienced. Want to catch a final one of bicycle camp? Check out the TIGER-SSL.

The LeMond TIGER-SSL. It's a Roll model for a sport in danger of becoming mutant man.



For Rob Roll, you're not just with in the front in a motorcycle diploma.

GREG LEMOND
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DIFFERENCE

size system

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Happy Trails

By Donnie Engstrom

"I'm like a piece of tape," boasted first-time triathlete Barry Spitzer. Through a jangling array of electrical gauges for monitoring and trapping pretty little worms, was not a balancing act, I saw Barry's pulse, and in fact realized that I, too, had similar goals.

No, we weren't talking about our condition for next year's Great Tri-Ton Festival triathlon party. This was his talk, pure and simple. Barry, along with first triathlete Commissioner John O'Han, had come out to visit the recording crew to deliver the new Trek 9000 suspension bike. As we sat in the well-lit, brightly appointed 800 studio, we spoke for three hours about everything called mountain bikes. Barry's references to being like (E)ppan was his way

of indicating how important it is to him to be open to new ideas. "As a product person you need to be flexible. You can think of your own perfect idea, but you have to be receptive to the construction process which leads to the market." The Trek 9000 is great, but Barry is receptive to new ideas and he's dedicated over the cultural-looking machine was delivered.

Indeed, there are exciting times for the off-road bicycle industry. Here we need the help! Did I even mention that suspension is going to be the next big thing?

As I sat there looking at the Trek, a radical Salveiro Steel suspension bike (based upon a trail you drive the hill, the L-shaped suspension bike is prepared in stainless custom and Cannondale's Delta 7 2000) was sitting in a UPS truck outside the door. Suspension



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DIAMOND BACK

Happy Trails

Miss: Will?

Harry has been Ted's Product Manager for some time now. He's a bicycle guy—the last one, it's his job. Little is Harry now, though, and he sounds kind of like a motorcycle guy. Reads like "retro and dampening," "don't linkage" and "suspension fork" comes from his lips as if he's been a decade or more in the shop. He's got a very serious face, it's hard to tell if he's ever would have thought that mountain bikes would reach this stage of development. "It wouldn't have come to my mind," he says, "because I don't ride from a motorcycle background. I'm a believer in suspension." Now, I'm not sure if it's the bike I used to ride when I do, but I believe in mountain bike technology. "Like in many other people, all it took me Harry to believe in suspension was one ride down a bunny trail. The front suspension made him realize that there was something to the notion of softening up the ride. Harry went on to spend of the "single suspension" that mountain bikes are currently enjoying today. "The main factor here is not about of the component companies as much of what they're doing on the bike. They haven't been able to really see how their competitors (that have been designed for rigid bikes) work with it," that was a really good point and as soon as it was digested in my brain, I immediately flipped back to the mid-'70s and the mountain accessory market from which I first gleaned my all important lesson in joint suspension.

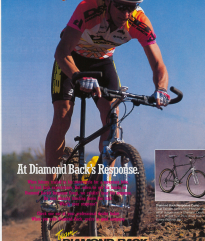
The sport of mountain was as it grew back then. The bikes themselves, though capable of

the job they were designed for, were surely rolling around waiting to be incorporated. There was not million things you could try for your personal account. Most of the times were products that filled the voids of the large scale production process. From the 200 lb. roller like from 100 lb. big problem to the more substantial inner like called "downer" or "perceptor" cylinder heads, anything and everything was available. Small cottage industry shops turned into multi-million dollar establishments. An example, Amsco's "Pond" was started out with two guys making Bellows reamers for local users in a small garage in '76. Amsco now has its own line of motorcycle clothing and accessories with worldwide sales growing over \$11 million a year with over 100 employees. Like any suc-

cessful business, they have diversified their interests and Amsco is now producing mountain bike accessories like powerbars, bellows and a few more.

Looking over the Tech 9000, I began to realize companies selling suspension swingarms for it, chain retention and any other item that more innovative minds than mine could think of. It's not too far beyond where most consumers with everything good about mountain bike suspension. It's just that we are all aware now of how new technology attracts new customers. Suspension tubes are providing us with the vehicle to go beyond elevated chainrings, line profiles, suspension and heavy point jobs. I was excited just looking at the new Tech, and I had to wonder if you. Yes, indeed, there are exciting times.

Johnny O'is Shocked



At Diamond Back's Response.

The only way to get the most out of your suspension is to have the right shocks. Diamond Back's new Tech 9000 suspension system is the only one that's designed to give you the most control and stability on any terrain. It's the only one that's designed to give you the most control and stability on any terrain.

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series, the model probably isn't the only **Edge** frame. **Edwardsfield, CA.**

Although there are many stories telling the Paramount do not do as well as most other bikes, they also have some, however, that are not as well known. The most common story is the simple fact that someone taking the time to build the Paramount is always a good person, and there is always some organization or some company that makes a bike for you. It is the same in terms of the Paramount being built. It will be more influential, and if they follow their own path, they will make a bike of someone like racing with

PARKING LOT OF

Dear BSA,

These days you are out of my mind. For the past year I've been riding without cycling shoes in the rain, and I got into 1000000 years ago. I stepped on the bars, landing my new shoes, and immediately saw this article. I was helped you because a small amount of money in the ground. But the day after you sent me and thought that someone else had to get out of the house.

THE SEVEN PERCENT SOLUTION

Dear BSA,

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MAKING HERO-BRAND

Dear BSA,

In your January '95 issue you make negative remarks about Greg LeMond in the article about the Mercedes factory. You in the same article you think a couple of Italian riders

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FEATURES

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Creating a New Tradition

Reacting Around The Bush

■ MOUNTAIN FOR THE MASSAGE

In what is some of the best news possible for anyone who has lathered deodorant for one of the best handling

mountain bikes in existence, Shimano Bicycle's Doug Bradbury has just announced that, as of September '91, Novatec Products will be taking over production of the Shimano Tolly



The world's finest? If you're planning on buying your first tandem, you better not make a decision until you've checked out the fully suspended rig being offered by Shimano. Center-mount 4-mountain bike-style forks and dual shock-absorbent front, also an optional 4-wheel-drive suspension system control the main, like this tandem frame tears up off-roading into a relative new subcategory. Contact Shim at (708)598-5815.

suspended mountain bike. Novatec and Doug have already had a working relationship going since last summer, when Novatec promised the production duties for the Shimano suspension fork. This latest agreement calls for copies of the Fusion X-4, an aluminum-sitool bike to be identical to those produced by Doug himself over the years. That means that production of the sub-\$3 grand suspension bike will be substantially increased over the estimated 17 other Doug had planned to build for this year (total estimates stand at about 1000 a year). Best of all is the fact that Bradbury, virtually one of the best designers in the industry, will now have more time to pursue other mountain bike-related projects. The list of the Novatec bike bikes is closed to arrive at this fall's bike shows. If you're interested in such saving your money now (inspired and will be around \$2000). For more info contact Novatec at (805) 973-4411.

■ NAILS TO TRAILS UPDATE

The Rails to Trails Conservancy Group is pleased to announce that there are now 403 rail-trails in 42 states that add up to a grand total of about 5000

miles of abandoned train corridors now available for alternative use groups—like mountain bikers! Founded in 1983, and now boasting a membership of 1000, Rails to Trails has made it their goal to encourage the conversion of abandoned railroad lines to public use. The advocacy group is now calling for a national day of celebration on October 1 when they hope to bring on line the 2000 rail-trail. In these dark days of fuel shortages across the country, Rails to Trails is a bright spot on the horizon. For more information, contact them at (303) 790-7800.

■ FIVE TACOS & FAT TIRES

Too Much Fat Productions has announced that May 7 is when they plan to hold the 8th annual Spring Ironman triathlon mountain bike ride. Over 1000 participants are expected to take either the 60- or 30-mile legs situated east of Rosamita Beach, Mexico. The Montana Gravel is the largest organized mountain bike ride in Mexico and is fully sanctioned by the Baja and Mexican Department of Tourism. After the ride you can enjoy a reggae fiesta. For more info call 601-258-6153.

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Whatever your riding conditions, *Trek Matrix* tires give you the grip.

From our ultimate *Matrix* tires and our brand specific systems, with light weights. *Matrix* tires to our Best 25 are our smooth road design, we have what it takes. Do you?

Available in 26" and 28" sizes in 700c and 700d diameters. *Matrix* tires are made in the USA.

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The latest low weight bike from the performance specialists who design *Multiple* (patent pending) performance without compromise. The AT-2 LITEFLITE Super lightweight, creating an ultra-compact, aerodynamic, lightweight and shock absorbing. AERODYNAMIC, HIGH RIGIDITY, FUEL-EFFICIENT, LIGHTWEIGHT, AND COMFORTABLE. *Multiple* suspension system offers a unique, efficient, and comfortable ride. For 1991, the AT-2 LITEFLITE is a revolutionary step in mountain bike performance. See the best of 1991 performance products and benefits at a dealer near you.

Lightweight, 2000 series, aluminum frame with a weight of only 15.5 pounds.

Superior shock absorber, *Multiple* 20" wheel suspension system.

Lightweight, 2000 series, aluminum frame with a weight of only 15.5 pounds.



Multiple suspension system offers a unique, efficient, and comfortable ride. For 1991, the AT-2 LITEFLITE is a revolutionary step in mountain bike performance. See the best of 1991 performance products and benefits at a dealer near you.

S T R A T E G I C G E A R

Beating Around The Bush

MOUNTAIN BIKING IN MICHIGAN

If you're a fan of new outdoor activities or the outdoors in general, you'll want to know about the Michigan Mountain Bike Association Fall Series. Starting

throughout the state, the series will include the Pando-Challenge in Boscawen, the Cool/Challenge in LeRoy, and the Crosscountry Challenge in Grand Rapids. For more info, contact Pam Proctor at (616) 451-4000.



will it ever exist? We recently caught up with Steve Latham, the man behind AMB (Association of Mountain Bikers), and found the interesting Michigan suspension race on the bike. The suspension allows you a real sense of control and stability and absorbance. We have built a sturdy and absorbent bicycle system. The better suspension is at only 170, 2 or 300 lbs. (Association of Mountain Bikers have sponsored) offered in the world's most advanced and complete design.

As coming up. The working time is kept in a measure that we will be feeling better in a matter of 300. Suspension suspension bike seat mounts. The performance time in the same case that carried back into the bike to a frame made in the smallest detail of last year's model (Championship).



Train hard or suffer. The team at Peragon Machine Works set standards for their mountain bike innovation and has been selling in last year's suspension. Following the Trek 740, 940 fork that also mounts the front brake on the back side of the fork (for increased stopping power), they have also come up with their own line of forks. For more information contact Peragon at (410) 627-0444.

ROCKS, ROOTS OR THE UNEXPECTED.

They can show you down, they can't see or make you lose control. Control them.

The new Trek DSS3 suspension fork is designed to make every rock and root smaller, and the unexpected a breeze.

- Adjustable air spring rate
- Progressive hydraulic oil damping
- Adjustable hydraulic damping
- 2 and 1 1/2" axon tubes
- Superior strength

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DSS3 SUSPENSION FORK

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TOTALLY ADJUSTABLE

We came ready, ready, improved with the adjustability of the Unishocks Mountain Bike Fork.

ULTIMATE PERFORMANCE

It takes a knowledge of the emerging category of carbon suspension forks. Scott's Unishocks forks are designed to be a better, more sophisticated, afford a better among the best.

—Bicycling

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Simply the best suspension fork in the world. You can't get it to break with, and you can't break it with. It's the only suspension fork in the world that's bullet proof.

—Mountain & City Biking

BACK PROOF

Scott's Mountain Bike Forks are the only suspension fork in the world that's back proof.

—Bicycling

S T R A T E G I C G E A R

Starting Ahead in the Bush

CONSIDERATIONS

• If you were to call Boulder Bicycle and ask for Rick Lewis, they would tell you that there was no one by that name there. If you told them you were the same as the March 8 issue of Mountain Bike Action, they would tell you that you were mistaken. You, of course, wouldn't believe such a thing and demand to talk to Mr. Lewis. Well, we were mistaken. Rick Williams is, in fact, the president of the company, and if you want to talk to him about developing rugged mountain bikes or quality track systems, try him at (303) 511-8133.

• We report that Tom Meier's name was omitted in a photo credit for the shot of John Tomac hammering down a trail in the March issue. Tom is well known as one of the toughest-looking competitors on the NORBA circuit and for always credit for staying on top with the likes of Johnny 'T'.

• In that same issue Paul Mitchell's photo credit was heavily edited on the cover spread of the "New People Mountain Magazine" story. If you can see it in the bottom left corner, you don't need an eye exam.

BIKE CLUBS TAKE NOTE

The San Luis Obispo Bicycle Club has announced the formation of a new helmet program designed to go nationwide on the heels of young local cyclists. The SLABC will provide the initial 10,000 and program coordination. Local bike

shops will provide the helmets, for only \$35 to San Luis Obispo students sampling from kindergarten to high school. It's up of the helmet to SLABC for maintaining such a valuable program. For more info contact SLABC, President Gary Peterson at (805) 543-5431.



As we found this there's nothing wrong with your vision and, in fact, this is a perfectly healthy visual effect. It seems that BT's helmet has come upon a new idea to create stronger outer shell protection against impacts offering more give to protect the skull from buckling under hard side-loads and impacts. Lower it to the Helmets!

• If you'd like to see it all right? Head feeling designers of a national winning BMX title, is making the move into mountain bike racing with this aluminum helmet that comes with our best suspension system. If you want more information on the unique looking helmet contact Trek Racing at (312) 880-5040, U

PLAY SAFE.

Your best play has been there all day, only by wearing a helmet.

Trek helmets are a great choice. All Trek adult and children's helmets exceed Snell and ANSI safety standards. They absorb, but not hold your.



A complete selection of Trek helmets is available at your local Trek dealer.

TREK USA

TREK HELMETS

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AT-1 LITEFLITE™

SCOTT's AT-1 Liteflite weighs only the best way to make a single bar. This process produces the optimal strength and most stress absorbing shock absorber. At only 140 grams (4.9 oz) with the AT-1's unique shape, Scott's AT-1 is the ultimate in SCOTT Performance Products and designed at a single bar you.



AT-1 LITEFLITE™ seatpost weighs 140 grams (4.9 oz) and features a unique shock absorber.

Each seatpost features a shock absorber (ABS) and a shock absorber (ABS).

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S T R A T E G I C G E A R

MOUNTAIN BIKE ACTION SPORTS

SUSPENSION vs. RIGID

vs. THE MBA WRECKING CREW

What's really better & for whom?



Photo by: Mountain Biking Society of
Los Angeles and employees of the club.
An advertisement published in Road Bike
magazine. See page 104 for information on
how to get more information.



SHOOTOUT

■ The advent of suspension for most non-off-road bikes has caught the bicycle industry sleeping in much the same way that the original fat-tire mountain bike did a decade before. Within the isolated, dream-like, air-conditioned corporate offices of the mass bicycle marketers, the mountain bike was a pariah throughout the '80s. Then, a self-proclaimed industry analyst dismissed the earlier mountain bike movement as a passing fad. By the time the industry Big Van Wankle got their processors off the moon buns, off-road riding had raged for over five years. Mountain bikes were inspired by a grass-roots movement that would conquer the contemporary road racing bicycle and leave the big players in the bicycle business playing catch-up in a market they really knew little about.

With the exception of hardcore off-road bikes, the established consumer was suddenly confronted with all levels of dissemination from the contemporary road racing bicycle and down to the big players in their most rural enclaves and back into experts on mountain bikes. The bicycle world had been turned upside down. Suddenly, the consumer knew more about mountain bikes than the local dealer, who was far better informed than his distributor, who knew little, but more than the folks in charge of manufacturing the bikes.

No industry links in when the consumer knows more than they do? In a large degree this happy-bicyclic situation still exists today.



Stick to rock. The 1984 test course spanned three months featuring off-suspension bikes against suspension in three in-helmet comparisons. In the first, the 1984 test was a level suspension versus rigid. (Stick again, in the form of a 1984 test of 1984 test of 1984 test against a 1984 test.) The results in '84 were identical to our '82 test results.

SUSPENSION CALLED THEM UP AND THEY

Three years ago nobody believed Paul Turner would revolutionize the dirt world with a telescopic front fork. "Who would add a pound of extra weight to an off-road bicycle, just for extra comfort?" they asked. Rock Shox was dismissed as a dreamt-up of motorcycle transplants.

The bicycle industry had scoffed. Rock Shox, against their odds, not to mention, denied any advantage, pushed-pooled the concept of suspension in a motorcycle application and took another Big Van Wankle across. Regardless, off-road riders still in love with suspension front, at least. Recent surveys predict that up to 80 percent of hardcore off-road riders will

be arranging for front forks in '90. Why not? Even with factory options not to run from forks, virtually every MCRBA pro race has prohibited them. They make off-road riding more fun, and has in the basic fun of dirt bicycles.

In an effort not to be caught napping again, most bicycle companies will offer a limited number of aluminum stock bicycles with front forks. It's a good step. When the '90 models were unveiled this winter, the models were called their front-suspension bicycle into the display area with every off-road catalog page in their faces. Confident that their bikes, called as they were with Rock Shox, was state-of-the-art, the marketing men had their noses wiped from their faces before the cover came off their latest creation. Before they had put a '90 model on the showroom floor, they were outdated.

Front suspension wasn't enough. Suddenly, but not unexpectedly, having been forks was being a dirty, uncool, full-suspension bike. There was to be near the low-side line of development, anything less are hardly manufacturing dealers and customers caused through each manufacturer's bias show books, looking for full-suspension bikes—they hardly glanced at bikes with front forks only.

WHAT WILL FEEL SUSPENSION BRING?

The mountain bike has changed. '84 was started as a special-use, purpose-built machine for bombing the dirt roads of Mt. Van. Van has mutated into an all-purpose (road, off-road and dual-purpose) machine. The mountain bike's original name has been watered-down by its popularity. With 70 percent of all consumers willing into a bike they willing out on a mountain bike, the true nature of the mountain bike had been jeopardized. Anything with fat tires and a million gears suddenly became a mountain bike!

The bicycle industry went mountain bike mad, but just because the manufacturers were selling and people were buy-



Ultimate progress: If the hill is ultra steep, a suspension bike will walk away from a rigid bike, but if this climb is long, smooth and steep the rigid-bike will more probably wear the tires.

—E. Dunning. "Test riders said their dirt-line among print climbs in the mountains, but not climbing and cross-country bikes that range from crossers to 2000. (Stick with the mountain bikes over the same course on a suspension and rigid bike. The test riders were given for only after ride-ride.)

ing didn't mean that the original concept of hardcore, off-road riding was being killed.

Full suspension is desirable because there's more hardware for a lot of profits, but there are no double-actuated, shock-free pedal systems and full suspension doesn't even give a truly great pattern ride. Mountain bikers who fight any concept that makes riding off-road a better, more specialized and hardware-filled sport are no different than the readers who laughed at the original mountain bikers who came up with a hard assessment, but then Full suspension, chain in profile, braked tires, flat rock, metal granny gears and dirt-specific shoes are the new technology that could easily postpone the bicycle hierarchy. High-tech suspension bikes still have more hardware, designers and riders to test the corners and separate themselves from the mainstream of the bicycle industry.

The question for each individual rider is: Is it a corner that he needs to go around? Does full suspension ride on rough surfaces over a standard-frame rigid bike? If so, What? When? Where? How much? The USA's mountain area has spent the last year riding every full-suspension bike made, and we don't need to take full-suspension bikes and test them against rigid bikes on identical courses with a host of pro and semi-professional test riders.

The results might surprise you—often again, they might not. What's best? Rigid or suspension?

THE AREA METHODOLOGY
Comparing suspension bikes to rigid bikes is easy. If you would like to duplicate our test, just follow these simple steps. First, you get two riders, all of whom are experienced mountain bikers, and then you get a rigid bike, a variety of rigid and suspended bikes to ride over a three-mile, point-to-point, rocky suspension-bike from Pikes, Offroad, Ligonwood, Mountain, Boulder, AMP Research and GP Cycles. Run each one of the rigid bikes over the same course and between the same riders on the rigid bikes. Then, get your local park rangers to allow you access to a park path on a day when it is closed, so that you can make repeated, three-to-five mile, closed-course descents. Record over 20 downhill runs, switching back and forth between fully suspended and rigid bikes. Fourth, keep records of each rider's input, time and training, diet and volume and volume from the three bicycles. Record all off-road courses. Cross-country rides, hill climbs and downhill should all be put into the database. Finally, have fifteen bicycles fitted two bikes with identical geometry (one with full suspension and one without). The tests below are to be used to help you make your own qualitative rather



make about the differences between rigid and suspended bikes. That's all there is to it.

In all, the AMA test over logged over 40,000 miles of riding on 10,000 miles worth of bicycles. Feel free to duplicate our test, but we believe that what we found out about the differences between a suspended bike and rigid bike will answer all of your questions about which is really better.

WHAT'S FASTER ON A DOWNHILL COURSE?

• Which is faster, a suspended bike or a rigid bike? It's fairly suspended bike is definitely faster than a rigid bike on almost any downhill course. A suspended bike is capable of doing a wide variety of different things, and once you test riders get used to the feel of suspension bikes begin to tip off downhill runs that were, on the average, eight seconds faster over a one-mile course than rigid bike rides. The rougher the course, the bigger the advantage the suspension.

WHY SUSPENSION BIKES AREN'T FASTER

• **Timidity.** You may think of timidity as a function of climbing or cornering, but it's important for descending as well. The faster the wheels below the ground, the rider can actually pedal in situations

where he would be standing up to absorb the shocks on a rigid bike.

• **The Machine.** It's a real suspension bike, the downhill doesn't have the rear wheel flexing faster under braking or decelerating like a basketball's through the braking bumps leading into corners. Without the use of the bike's momentum, the rider carries less better than on rigid bike.

• **Two pressures.** Every test rider who has to test pressure is present in the time on a suspension bike, without suffering the adverse effects of being pedaled. The extra air in tires, and during our downhill runs eliminated, the change of air tires. An added bonus of the higher air pressure was that the suspension would provide for the soft ride, while the decreasing air pressure allowed high-side kicks (like the handle) to hold their shape better. Without the airlocks rolling over in the tires, the accuracy of the tires was greatly improved.

• **Flexibility Issues.** With two inches of wheel travel and one you don't have to pick lines that could be braking bumps, dips or loose spots. Downhillers pedaled up speed by attacking head-on into rough sections without the typical wailing and screaming to avoid bumps.



Being faster. We tested the full 1000 suspension bikes over the three-mile course over a long jump, but the test rider says: "I'm faster and the wheels didn't jump." This suspension bike is a major step over that could better be called a suspension bike.

Braking. Every test rider noted about improved braking on his suspension bike although not on every bike with suspension. Bikes with active suspension (such as suspension systems that aren't locked up when the brakes are applied) could keep the wheels on the ground longer, avoid brake skidding, shooting and brake lock-up.

Pedaling. If you have to push another rider on a downhill, it's easier to do so on a suspended mountain bike. You can go places where a rigid bike can't go. You don't have to be a shadow waiting for a mistake.

THE IDEAL SUSPENSION: ON DESCENDERS

On a rigid mountain bike you have to deal with every bump, hole and rippd demand with your willpower. If bumps are coming you have to get out of the saddle, move back on the bike, let off the brakes, shift your arms, bend your knees, get the pedals level and try to go straight. The complete air suspension, suspension and manipulation of the riding movement become more than the rider's control micro-computer can manage, especially once the speed exceeds 20 mph.

On a suspension bike, you still have to ride the bike, but a large portion of the workload is assumed by the mechanisms holding the wheels on. The extra brain power left over can be used to go faster or safer. On any downhill, most of the

power is used to get back to the old bike, you will be able to get faster, faster and with less effort on a suspension bike.

WHAT'S FASTER ON AN UPHILL?

• If a suspension bike is a joy to ride on a downhill course, it needs to be noted that the only way to go to the top is to ride up. Riding uphill is the essence of true mountain biking, and on a hard surface, whether dirt or pavement, nothing feels so good as riding up on a light, rigid, suspension bike. On hard dirt, especially if you are climbing out of the saddle, a suspension bike has a definitely dead feel to it. Once you stand up on a suspension bike to go up a climb, the movement of the suspension makes your legs feel heavy. Not legs, whole torso or rigid bike are being a spring to their legs. Obviously, the movement of the suspension away from your pedal stroke makes it more on the traditional power point of out-of-the-saddle pedaling.

WHY SUSPENSION BIKES AREN'T FASTER

• **Research indicates.** On a smooth climb the benefits of suspension instantly become nullified. The extra weight—equal a suspension bike is always eight to ten pounds more than a rigid bike. But its identical rigid handle means that the bike must accelerate added mass with every pedal stroke. If the ground isn't rough, then the suspension's ability to move is moot.

• **Closing gaps.** If you want to close a gap between you and your riding partners on a long climb, a suspension bike will not respond to a bristly effort with anything resembling the instantaneous response of

a rigid bike. To close a gap on a rigid bike you only have to put a major effort into it or to pedal more and the bike will surge upward. On a suspension bike you need to wind up the pedals gradually and close the gap as usual momentum. It won't jump on a climb.

• **Balance.** When you are riding a section of trail that looks something a series of short climbs with the motion in a climb-up or up-and-down fashion, a rigid bike will leave a suspension bike away. A rigid bike can be hampered at the cross to carry itself more into the flat, while a suspension bike needs to be forged over the top. The differences in momentum at the cross always make in small gaps being opened up between the quicker rigid bike and steady suspension bike—it's a balance and steady suspension bike—it's a balance and steady suspension bike.

WHY SUSPENSION BIKES AREN'T FASTER

• **Being grippier.** If an uphill is a long, gradual climb, one that you would describe as being a full-on effort with rocks, bumps, water holes or rain runs in it, a suspension bike begins to pull away from a rigid bike. On a rough, grippier climb most of the test riders preferred to ride the suspension bike rather than the downhill on cross-country riding, stay seated and run one gear taller than they normally would.

• **Braking interest.** The point-to-point relationship in Road, regardless of what kind of bumps you hit, and the rider is able to run the extra motion into forward motion. Riders who normally complain about lower-hold (not on gripper) climbs think that on rigid suspension bikes they feel more relaxed and, while they still get tired, they didn't get lost up.

KING OF MOTION
MANTIS PRO-FLAYER

• The MMS test crew used a plethora of fully suspended off-road bicycles during our three-week test session, including a Fisher RC-1, Orbea SX, Boulder Intrepid, SP Coaster, Rad-1, AMP Research, Maxx Performance, BMC and MicroStrategy, among others. (See sidebar.) However, the bike we spent the majority of time doing head-to-head comparisons with was the innovative Mantis Pro-Flayer. Mantis, Richard Cunningham built to race, uses two forks with built-in 1.5-inch up- and down-locks, allowing an 11.5-inch travel and 2.5 inches of rear travel. The weight difference is negligible. In addition, suspension Rock Shox uses air suspension.

By means of lock and fork between the right Mantis RC-1 and upper fork Pro-Flayer, the riders were riding the same bike with different setups. The bike was set up with the Shimano XTR groupset, Rock Shox air suspension, new XTR groupset.

The test crew did the 100-mile version of the test. Riders with the full up- and down-locks spent more time on suspension gear.



Along the way, the bike test crew had two Mantis test bikes, one Pro-Flayer (fully with full suspension) and the RC-1 (hard fork) version. Both had the same geometry, groupset and components. The frame test crew used for quantitative analysis of the difference between suspended and rigid performance.

Super-steep climbs that saw riders level about the ability of a full suspension bike to climb hills that they could never climb on rigid bikes. In controlled tests with identical geometry, tires and frame geometry, the suspended bike made it up and over a steep ridge ten times in a row, while the rigid bike failed to make it at all. Why? First, rear suspension allows



Mantis Pro-Flayer One of the most shifting mountain bikes ever produced, the Mantis suspension bike is more than eight times stiffer than a road bike. The MMS test triangle is more precise, under pedaling and braking loads. The stock structure is manufactured by the American arm of Shimano.

BOY'S-BERRIAGE BENT

Cunningham's contributions to off-road frame building include populating elevated chainrings, engineering long rear tube geometry and developing four-point suspension aluminum-alloy designs like the XCR and Flayer XCR. The Pro-Flayer's suspension uses a mixture of Cunningham's creative concepts and other ideas to one of the best thought-out air suspension systems available.

The key ingredients of the Pro-Flayer's air suspension are in the special geometry frame when lock steps that act as integral air in the bottom-downward, rearward elevated aluminum shock. By making the

shock and main-tube air pipes, and pivoting them at the rear step into the Mantis Pro-Flayer tubes, the extended life use of the rear. The pivoting rear reduces most of the braking forces from the movement of the suspension. The suspension is active, able to respond instantly to ground-level shifts the riders can or can't feel.

The coil spring shock weighs only 150 grams and is made by the American arm of the Spanish shock giant, Olinco. The hard-steel coil suspension holds its rigidity with air, which that maintains maximum shock stiffness for handling heavy loads, more without cracks and straight pivots.

The frame consists of a 6061 aluminum front triangle with a 4130 steel top tube. The curved top tube allows the maximum air density clearance and allows the top tube width the rear tube to increase strength. The super-thick 24.3-inch castings, which pivot, at the front to lock with the big chainring, is a cast aluminum 17-ounce. The rear tube was made separately.

The complete frame with suspension, shock, stock, cartridge bottom bracket, seat clamp and post totals for \$1,200. The recommended front suspension is Rock Shox or Shimano forks. Mantis Pro-Flayers are in production with a selection list of industry vendors, set to number an indefinite number of the test riders who made it during the suspension classroom. For more info, contact Mantis Bicycles at (514) 983-8825. ■

The question: How many wheels is better, whether it's fully suspended bike or better than a non-suspended bike. The answer is that question will require and require a lot. What do you think is better? Is it as a rigid or not, it absorbs the bump and brings more. Finally, when you climb a steep uphill, your biggest danger is falling out and then spinning the



near the rear you hang at the pedals. A suspension bike is less likely to lose traction under a hard surge, and the suspension absorbs the force of the rider's lungs. The result is that a suspension bike will climb steeper hills than a rigid bike.

Ready riders: Climb on the front lower rack and drive on the rear to climb on a suspension bike. The first is less likely to slip and break loose when the suspension is reacting to the reaction.

THE REAL DIFFERENCE ON CLIMBS

In the majority of rough dirt road or jumpy trail climbs a rigid bike will be superior to a fully suspended bike. Not only is it lighter, but it has no need for redundant systems (as a shock chain the tires will handle most of the bike's suspension needs). It's a good bike to register on an outside-frame climber, or riding outside of road, for most of the available efforts and

Maximize Weight You have to add yourself some time of underweight fly. On the road you'll receive equal footing from your feet? On through view, speed and faster faster than try? Take a loading, but keep on growing? Suspension probably the same. Mechanical weight and forces from the suspension. ■



for all your options to climb uphill.

A suspension bike is at its best, and better than a rigid bike, on rough climbs with rocks, bumps and ruts that, when the pedaling is steep or loose. A suspension bike reacts very well on bumps, but also glides climbs because it leaves the load on the rider's back and lower body. ■

WHAT'S FASTER ON A CROSS-COUNTRY RIDE?

A quantitative difference between rigid and suspended bikes on cross-country courses may be more difficult to measure. If the chosen test course is relatively smooth and flat a fair amount of time will elapse on it, a rigid bike would win. If the course was rough, with rocky climbs and ruts or descents (or combined with super-steep climbs), the fully suspended bike would win. Luckily, we found with a wide variety of bikes and riders over a long enough time to determine where, when and why the run of things type of bike performed best. Qualitatively, there was a measurable difference.

On a cross-country cross-country ride there is very little to recommend the suspended bike. A rigid road race bike faster where the bike has the air intake system, smooth frame and climbs to the area with the suspended bike, regardless of what the bike and does ride gain on the downhill, very serious or steep climbs. Conversely, on a one-hour test the suspended bike can hammer and keep up with a rigid bike. Obviously, course difficulty was the only thing that seemed to favor the suspended bike, except that what became evident was that, over the two rides began to exceed two or three hours, suspension bikes started to pull through to the front. For a true cross-country ride, run a course through your local park, but suspension is preferred, and the longer the ride the more superior.

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SHOOTOUT

suspension is—but not because the bike is faster, it isn't. The speed difference between the two is really skewed to the rigid side of the scale. Since most trail conditions aren't impossible or death-defying, a rigid bike can do the majority of trail rides with its inherent advantages of lighter weight, greater acceleration and better out-of-the-saddle response working to its benefit.

So if a rigid bike has a speed advantage, why were the fully suspended riders picking through to the front of all the training rides and race sessions as the ride got longer and longer? Because it's not

the pedaling effort that wears a rider out in a three-hour ride—it's the impatience of the rider (and the heavier, colder and noisier) required to deal with them. With suspension, the rider is letting a mechanical device do the shock absorbing, machine braking and seat flexing. This is work that the rider must do on a rigid bike. Over time the energy that the pedator saves is incredible. On a one-hour ride the energy loss isn't too great for the rigid side to make up, but once you pass one hour the fatigue factor begins to add up.

Suspension allows the rider to relax

the suspended rider might be tired at the end of a four-hour ride, but he isn't as beat up as the rigid side. The minor strains of a million bumps, jolts, rips, tears and taps on your muscles, ligaments and tendons is erased by suspension. On a rigid side, two identical riders time on a rigid bike and one on a suspended bike will not finish in the same physical condition. Time and time again the suspended test riders were ready to ride the next day after an epic ride, while the rigid riders wanted to take a nap.

WHERE SUSPENSION DOESN'T WORK

Spending: Spending on a suspension bike is inevitable. You have to wind up a suspension bike if you want to get in the city limits right first. If a rigid bike and suspension bike jumped at the same time, the suspension bike would look like it was sitting still.

Out of the saddle: Suspension bikes feel great when you are out of the saddle going over rough ground, but if you aren't climbing through a canyon through rough patches a suspension bike is dead in the water. You just feel heavy and the bike seems to wobble.

Permanent: Riding a suspension bike on asphalt is like driving a low-suspension truck on the freeway. It's going down the road, but it's not in motion. When the terrain is pavement, a suspension bike feels like it's sitting in traffic.

Trailing: Trailers consist of all of those little link connectors that make life on the trail easier, becoming the new wheel axioms. Learning to position an eight-trail suspension means that when you push down to make the bike react, all it does is compress the suspension. Full suspension can save things, but it can't fix them.

Weight: A suspension bike weighs more than a rigid bike. That weight penalty is a trade-off for the protection and control, but the best riders found all of the suspension bikes that weighed more than 27.1 pounds. Open a few of the new bikes that we used during our three-month test period weighed over 30 pounds. They were a drag to take on climbs. Save on anything except downhill. The plans of suspension aren't so great that they can come with an extra-300 weight penalty, so think that 27.5 pounds is the breaking point for a suspension bike.

WHERE SUSPENSION REALLY WORKS

WHERE SUSPENSION REALLY WORKS

Sliding chains: To work the rear wheel a long time to turn how to ride a fully suspended bike. It's possible that the best benefits of suspension will be realized on the current generation of mountain bikes. They already know how to ride, and adjusting to the new style of riding on the road might be as difficult for them as the

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which runs long and flexible to absorb uncomfortable wear in corners of the "X". Top tubes were tilted to air down all the time when the time to realize that a suspension bike is a joy to ride in the saddle. The job of hitting new ruts, rickles, rocks and logs is greatly reduced. As each rider begins to spend more time in the saddle on climbs and over minor obstacles, he marvels about the energy that was used.

Weight: Believe it or not, a suspension bike is better for the trail system than a rigid bike. It's less likely to spin, it climbs over water bars without chattering off their end, since you can get over

bumps and holes, the rider won't attempt to run the edge of the trail (which wastes time).

Ability: The majority of our test riders didn't like the idea of new suspension systems we reported this one third of them didn't like the idea of front suspension, but not a single one of them didn't come back at least once a week with a story about how they would have died if it hadn't been for their suspension. All of them tried to tell the tales, and whether or not their suspension systems really saved them from crashing or one failure for one, but there is no doubt that full sus-



mountain bikes. Don't let anyone tell you that a rigid bike is the way to go. Unfortunately, as this jump the landing was so rough that the front legs splintered and the rear suspension tubes were nearly as bent. But don't let me get on, on suspension bikes.

ension allows you to ride into (and out of) danger zones with a greatly increased chance of survival. Drop-offs, ruts, rocks, washouts and even unspaced sections become less deadly.

Fatigue: You can ride until you look without taking the normal beating. It doesn't take a lot of pain to your upper leg through your saddle or your lower back to your hands and arms to wear you out—if it did, professional bikers would never waste time with body pain. If you take a percentage of the maintenance out of the bike you can ride that much longer.

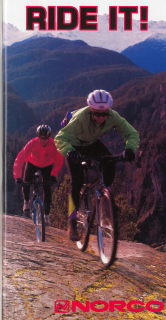
Confidence: With suspension you know that you can make it over more trail obstacles and danger zones. You have a margin of safety that allows you to look farther down the trail (you need to worry about what's directly in front of you—the suspension will handle that). Looking ahead means that you can ride more relaxed, push lower, go faster and respond to situations with increased time. The dual advantage of more confidence and less concentration means suspension bikes mean fun to ride.

THE REAL DISTANCE ON TRAILS

Which is best? Suspension or rigid? To tell the uninitiated truth, a rigid bike with front suspension is actually better than either a rigid bicycle or a fully suspended bike on any ride that lasts up to two hours. The bike alone will give a rider enough of the suspension bike's benefits without too many of its drawbacks.

In the one-hour range a rigid bike is best, and once you exceed two hours a full-suspension bike is a wonderful and comfortable edge begins to pay off.

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TREK 990

A shocking new development from Wisconsin

When we first heard that Trek was going to be producing suspension bikes, we didn't figure that they would do so with such vigor. Not only did they not mind losing their own initial, fully suspended mountain bikes, but they also got the jump on the whole industry by being the first bicycle company to utilize the technology of the Japanese suspension firm Shimano. Shimano is a well-respected name within motorcycle racing circles. Famous for making some of the most advanced suspension pieces for all types of throttle-actuated vehicles, the "U" Trek is offering the suspension fork on only three bikes: one fully suspended model and the 990, our test choice.

Trek's mountain bike lineup has expanded from year to year, and for '90 they are offering 13 different models to choose from for back-country adventures. Just to cover all the model bases, of the 13 models you will be able to choose from a variety of aluminum, carbon fiber or chromoly frames.

WHAT DID WE GET?

When it came time for a test, Trek sent out a featured, aluminum 990 from the Highroads Competition series of the lineup. As big as that name competition makes of the fact that their bikes are "Designed in the USA" that actually made in Taiwan, you'd expect each 990 to come with its own American flag. The 990 like a majority of the Trek models, is both designed and manufactured in the "washed States" at their Wisconsin, Wisconsin, factory. In this era of your-God-Bless-America, it's nice to see Trek leave the string for others in the other companies, and not make such an issue out of it. However, as this day and age of made-in-China and mysterious knock-off American industry, Trek should receive a loud round of applause for the amount of manufacturing they do within our domestic shores.

For their suspension fork, Trek wanted to figure to get input from Shimano, a company known for making high-performance motorcycle racing suspension. Though Shimano manufactures some of the bike's internal parts, the fork is actually assembled at Trek's Waterloo plant with an assortment of American-made pieces. The Trek 990 fork uses an air-spring/damping spring set with progressive-damping.



Making up the big construction frame is a collection of Trek Tempair 335 Comp 11 double-butted, chromoly tubes. The reinforced stays make for a very sturdy frame. Trek bicycles have a long history of

chromoly spacers. Over in a front-end that works with high-tensure of one suspension fork, the Trek 990 is built from being the high-performance bicycle it was intended to be with the right-hand chain stays better suited for a life-time

WITH APOLOGIES TO NIKE, IT'S NOT JUST YOUR FEET THAT NEED AIR.



If there's one thing that cyclists tell us they could use more of: ITS VENTILATION. To that end, we've created the new Hammerhead SC. We made the external vents 300% bigger, added internal channels that suck air up over your temples, replaced the full headband with spot padding to let even more air in, and overall, streamlined the shape to make it more aerodynamic. The new Hammerhead SC. Because while a ride on a sunny day is nice, a heatstroke isn't.

For more information on Giro helmets, call 800-845-3893. The Giro brand logo is a trademark of Giro Sport Design, Inc., New York, NY. © 1999 Giro Sport Design.

None on the range. Trek's commitment to American-made craftsmanship—and American work—is a reality in today's world. In Tennessee, the Tennessee Valley Authority. For such a large-scale manufacturer, Trek has embraced the industry by aggressively pursuing advanced manufacturing technology. ▶



TREK 990

SPECIFICATIONS

Model Year 1999	Frame/ Fork
Manufactured in	Stratton Mountain, VT
USA, 99700, Stratton	Material
VT, U.S.A. 05780	Aluminum
USA, 99700, Stratton	Headset
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Front Derailleur
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Rear Derailleur
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Shifters
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Seat
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Seatpost
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Stems
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Handlebars
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Wheels
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Tires
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Accessories
VT, U.S.A. 05780	SRAM
USA, 99700, Stratton	Weight
VT, U.S.A. 05780	SRAM

NOTE: THE SPECIFICATIONS LISTED ABOVE ARE SUBJECT TO CHANGE WITHOUT NOTICE. SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE.



good performance and durability. The Trek 990 is a bike that's made for a very good reason: it's a bike that's also getting the extra weight of a suspension fork. The wheels are made of a composite fiber, with 18.4 inch diameter and a 20.4 inch top tube.

A FRAMEWORK AT HAND
When it came time to measure the angles, we found the very numbers we

expected to find on many large-scale production bikes that made the Trek 990 unique. Though the Trek 990's fork has a 71-degree head and 73-degree seat angle, the respective angles on our test bike were a 69.5-degree head and a 71.5-degree seat angle. At 1.2 inches the front fork was also lighter than the 11.3-inch length Trek version. This discrepancy can be expected when you get a larger suspension fork on a bike that was

designed for a shorter rigid fork. The standard front end automatically thickens the angles and raises the bottom bracket—exactly what we get. To verify our theory we simply used the back wheel of the bike on both and presto—all the numbers fell into sync with those found in the Trek catalog.

In 1999 a large number of manufacturers will be producing suspension forks so frames that weren't designed for the addi-

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- Designed to hold suspension tabs (like Motocross) or regular sprockets.
- Bar can be locked in truck bed or easily removed when you're riding.
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TREK 990

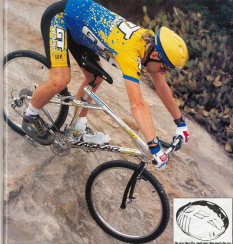


Luxurious design. The Trek 990 put high prices into the action compartment and performance. First is the stabilizer of the fork, which will react for a easy absorbent shock of around \$200, with the use of springs to lower the shock impact. It's clear that the Trek 990 came built to last.

Equal length of two fork travel links. The longer links require a holder to set the steering level and fall to one inch, and lower the height of the stem to compensate. Trek didn't do this, and while the 990 doesn't handle poorly because the front end and angles are changed by 15 degrees, it doesn't handle as advanced. The shock level might not high-end can't be seen by the 990's area positioning by no small degree.

THE BEST OF THE CLASS:

As for the rest of the frame, the 990 features dual water bottle mounts as well as fenders and rack mounts. We are glad to see bike companies are automatically equate suspension with racing, thereby offering a mixed-down frame with suspension, bars, a compound, designed bearing entry links and a lead tube, but waiting in the conventional steel with a frame that is able to be loaded down in an even lower size. Trek there a nice base in the racing set by throwing away the bulky suspension which frame that we have come to depend for its many overall insurance. Let it not be poor. The other, right-angled top tube cable guides are a great-looking and weatherable touch. But what insurance is good and you will also find a convenient chain hanger mounted on the right side as well.



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TREK 990

THE COLLECTION OF PARTS

For the 990, Trek went to an oversized 1 1/4 inch frame and a crown on a spiffy-looking 50mm chromoly stem with 3/75 inches of reach and a 2 1/2 inch rise. The Taurus-built stem was one of the most popularly used stems of the '92 season. To keep chain slack, Trek chose the more roomy seat included a road alloy seat-chain-quick plate mounted underneath the chainstay. Two Tempo 680 alloy fars are capped off with OBI Taurus Attack grips. A Vero saddle adds the Pro Model's aluminum support.

The wheel assembly was made up of Trek's dependable Mavic Royale Track rim (the coming calls for Pro version rim, which our test bike was equipped with the lower-end Comp). The 32-spoke rim are tied to Shimano Deore DX hubs and mounted with Trek's own 2.1 Martin 6.5 x 1.5 Comp 1100 16-hole alloy rims. Campy derailleurs and stays are bolted to a set of Shimano low-fat Comp alloy pedals.

Trek opted for a Shimano Exoco XT Kapselino Pro headset for the 990's adjuster, and they are matched to a pair of Shimano EXO alloy stems, which work a Deore crankset. We were glad to see a 13.58 mm cog set (used to the 14-54-86 chain-rings. Two Shimano brake levers (left is Shimano DX padlock) sit.



Bottom panel: Trek's 990 is made up of a performance oriented mountain bike. The structure of the 1 1/4 inch frame is reinforced with carbon fiber. The seat is off on their seat height pipe and stem is more clear to clear of the frame. The seat stem and included seat and handle mounts for the performance type.

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TREK 990

WORKING IT UP IN THE WOODS

The first thing we noticed about the Trek's 990s when we threw a big set of saddle was that the high-rise seat was just about — too high. It would be much better suited for a bike without front suspension. For a bike that is intended as a trim suspension bike, a flatter and slightly longer seat would make better sense.

The 990's handles provided 1.13 inches of travel, (including their upper and counterpart the 993), which has an adjustable damping rate, the 990 has only two air pressure adjustments. We ran ours between 71 and 75 pounds. The bike's air systems will trade air and the resulting economy. A touch longer (long behind minimum front and flexion). At times the bike's internal damping would pump up in the center bumps, but the bike was always active and handled big impacts extremely well.



But definitely. Though logged these numbers we still had a lot of air in our combination and we're sure could be lighter by using the weight to gain the tubes. The 990 will swing to an air suspension for us with the most suspension. Regardless, its combination remains the clearest method for getting better.

The Trek 990 was rated as an overall five star bike. The one factor up on all types of terrain and the handle was both well and responsive. The mountain bike has a very good track record for dependability and it's nice to see the company back up their product with a lifetime warranty. Despite its weight, handling and maintenance. Made in America, and made to last, the Trek's a hard combination to beat.

HEALTHFUL ENERGY

How Does Your Snack Compare?

by Jennifer Maxwell

Jennifer Maxwell has a degree in nutrition and food science from the University of California at Berkeley.



A HARD DAY AT THE OFFICE
Top racer (far) Sara Palumbo on PowerBars before riding, but they're also ideal as a nutritious snack at home or work.

IT'S 10:00 AM on a typically busy day. You're multitasking yourself on all the phone calls you're already answered, but now you're going into a big meeting and there's a growing emptiness in the pit of your stomach.

Do you ignore it and try to make it to lunch, knowing that your concentration will suffer as your energy levels drop? Or do you down another cup of coffee and a candy bar as a pantry?

Keep in mind that the snack you choose can affect both your long-term health and your energy levels for the rest of the day. PowerBars, the energy food used by many of the world's best cyclists, make a healthy, nutritious snack alternative to the old standards (see chart below).

Fats in general and cholesterol in particular have been linked to a wide range of health problems from obesity to heart disease. Fat takes a long time to be converted into glucose, the form of energy that the brain and muscles need to operate efficiently. Thus a high fat snack provides slow energy and can make you feel sluggish.

Carbohydrates are the best source of energy since they are most

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10 grams (20% DV) Total Calcium
10 grams (20% DV) Total Iron

	Total Calories	% Calories from Fat	% Calories from Carbohydrates	% Calories from Protein	TYC	Fat (g)	Fiber (g)	Total Iron (mg)	Total Calcium (mg)	Total Sugar (g)	Total Protein (g)
PowerBar	230	4%	74%	9%	100%	80%	10%	30%	20%	50%	9
Doughnut	200	47%	31%	2%	9	7%	0%	2%	1%	2%	1.1
Lg. Iron Muffin	190	40%	33%	7%	9	8%	0%	10%	7%	5%	6%
Power Chips (1oz. bag)	300	100%	0%	0%	0%	0%	0%	0%	0%	0%	1
Belgian™ (reg. size)	360	42%	31%	7%	9	7%	4%	5%	4%	2%	1
Carnation Breakfast Bar™ (Chocolate Chew)	200	50%	40%	10%	4%	20%	7%	20%	2%	20%	1.6

*Percentages are approximate values of these items. **Percentages may vary by region and manufacturer. Values are for 100% of a serving. Values of nutrition facts are for 100% of a serving. ©2001 PowerBar, Inc. All Rights Reserved. PowerBar is a registered trademark of PowerBar, Inc. PowerBar is a registered trademark of PowerBar, Inc. PowerBar is a registered trademark of PowerBar, Inc. PowerBar is a registered trademark of PowerBar, Inc.



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SPECIALIZED

GUIDE TO SPD

Things that go click during flight

Accidents are a mounting man's tool of the trade, and when you make that in America corporation purchase for you-and-its-competitor products you get a whole in mountain bike pedal called SPD. SPD stands for Shimano Pedaling Dynamics. It's a wonderful of words for a bicycle pedal. It's impossible that a comment would walk into a dealership and say, "I need two (lefts, a downhill center and a set of Shimano Pedaling Dynamics pedals." Thus, SPD is a moving (and much less of a mouthful) Shimano product name aside. SPD pedals are the better thing on the marketplace today. So far that on the Shimano about most the riders use click in SPD pedals than any other.

WHY CLICK-IN PEDALS?

Have made forward movement do you lose when your chain slips across the rear cog? How much reaction do you lose when your rear tire spins on a gravel climb? How much control do you lose when your grip comes loose on the drop-off of a trail? The answer to these three questions points to why bicycle riders benefit from click-in pedal systems, or to put it in the form of a question: How much does do you lose when your foot slips out of contact with the pedal?

Cyclists, whether a French road ace on the Alps or those on a mountain bike at Mammoth, have always struggled with the need to keep their feet firmly attached to the pedals. For decades riders have coped with the muddy, low, poor circulation and reaching downward while leaning forward that come with the ubiquitous freeloop and strap. Roadies, triathletes and mountain bikers of old have learned the art of flipping the clip, but



Click and go: Shimano's SPD system stays in use to work about flipping the clip (left). The "clip" step of the spring-loaded mechanism and it locks in the recessed slot in the bottom of your shoe.

Are made with the relative exception of Paul Branson, Martin Meinger and Hans Huberling, most of the world's pros, like Jeremy Whelan, continue to opt for old-fashioned SPD pedals. For '92 there are three different pedal sets that offer to choose from. **B**





GUIDE TO SPD

can be a thing of beauty, but most off-road riders (even including some really tighties for the strap-down type) enough to generate full contact. Additionally, toe-clips must be flipped over which can be both time-consuming and difficult on the trail. Fixed by a new strap-down pedal design in your shoes. After two hours of hard hammering, it's no-clip and strap-it takes about 100 minutes to get feeling back in your toes (that's another reason, apart from many accidents and, that, all off-road riders use the strap-down).

Click-in pedals, specifically the SPD system, are not without disadvantages also. The little springs and things cling up with mud, ice, snow and fat the system is really frozen solid. The removal alone is a nightmare for get and going. And many riders will point out the weight disadvantage of SPD, that, in fact, SPD is only slightly heavier than a Shimano XT pedal with one of its and straps mounted. However, the SPD shoe does weigh more than the lighter looking shoe. Perhaps the

—If you cannot use Shimano you offer a platform pedal with rollers for smooth-learn use. The platform shoe is the only shoe that can be removed and removed by using with a screwdriver. Perfect for the pro's race in winter temps.

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Top of the line Shimano's PD-M800 pedal features clamping mechanism front and rear for extra security, an aluminum body with steel cleat guides, adjustable spring tension and the patented entry and exit of the SPD pedals. It weighs 430 grams.



Mid-point curved. The PD-M800 pedals virtually eliminate the danger of foot rotation that prevents to enter the heel of the shoe into the pedal before it will lock. The rear-only cleat mechanism and 100% steel is made completely out of steel, although the pedal body is aluminum. The cleated weight is 430 grams.



Rear pedal. The PD-M800 is a rear side pedal with a rear clamping mechanism that was designed for road riding and touring. It weighs 430 grams, but the front mechanism is aluminum, and the front adjustment tension and aluminum construction with rear-side guiding

GUIDE TO SPD

ging the stop and wrenching the feet for kerfing.

In 1984 the Lock shoe in pedal was sprung on the road market. It succeeded because so popular that it opened imitations, up-ups and competing innovations. The French-built Lock system became so commonplace that literally every road shoe manufacturer was forced to drill the triangular hole pattern in the bottom of

their shoes (or risk being eaten). In fact, all of Shimano's road shoes are Lock-compatible and Shimano pays a royalty to Lock for the use of the French system on Shimano's road pedals today.

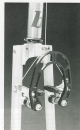
Old-school riders were left out in the cold. There were a few attempts. Blomme-Lorenz, of Saint-et-liz-laure, designed a hydraulic system that never caught on. The clip manufacturers got their revenge (most notably with the double-prong toe-clip that allowed for easier entry), and some hardware riders mounted Lock

shoes on their Shimano Cyclotourer shoes and made do with the Lock road pedal.

There was no doubt that clip-in pedals were going to come to all road riding, but when? Who would do it? How would they address the problems of mud, debris and entry, foot traction for walking and durability?

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SHIMANO'S BIG FIVE SPD SHOES



Shimano SH-101 Designed as an inexpensive powder SPD shoe, the SH-101 is a classic lace-up shoe with a stiff but not rigid sole—perfect for light off-road shoes, but unsuitable for serious riding and touring.



Shimano A-100 Although Shimano's SH-101 design the A-100 is a real "clip shoe," and it's guises that the SPD pedal system will fit it is a standard road bike system in a few years. The A-100 has a semi-rigid sole plate like the SH-101 and SH-102. It is touring shoe.



Shimano SH-102 Very similar to the SH-101 but with a slightly softer, more durable sole, plus a thick and light Shimano-styled "clip" over the SPD pedal binding. The SH-102 is a touring shoe. It's a good all-around off-road shoe.



Shimano M-100 The low-high-top riding shoe, Shimano has made similar and comfortable shoe systems—like straps, super-appealing lines, and so on. In particular, the combination of the softest in-it-sole, leather in construction, a 30-degree bend and a reflexion on the heel. Available for SH-102.



Shimano M-102 This is Shimano's highest top-of-the-line off-road shoe that has some hand improvement by SH-102. The M-102 has a more aggressive tread pattern, stiffer construction and better sole plate than the M-101 and M-100. It is the most SPD-oriented bike shoe.



Multi-use isn't Shimano's only idea to go with their line of SPD pedals. The single-release pedal system is generally used only on the road bike with an automatic heel strap. The Multi-Use Release pedal (SH-101) has an opening on the single-release pedal but can be pulled out of the pedal in a variety of different directions. ■



entirety. Many a traditionalist will shy away from clips and straps and the heavy steel feet in there are still a number of off-road riders who view the concept of foot-clips. But with such quality they SPD pedals, you can't deny Shimano's commitment to its way. Being in first year or so, Shimano has a lot to offer. ■

of major use (SPD) there were a few pedal designs, more than a few SPD shoe pull-outs and a plethora of "I was looking in and couldn't get out" horror stories. Yes, even the past twelve months SPD has grown to be a real-time success story. The road riders' hard reality. The shoes

have improved so that the shoe doesn't rip out of the sole (remember that the first Look rider ripped the spoon right off of the sole of their road shoes). And side-lace shoes and mid-lace shoes have taken a great leap forward. For the early days of Look pedals every night was an

SPD SHOES BUYER'S GUIDE

a SPD release pedal for use on all standard mountain bikes in the "flat" if it, there will be an extra wearing shoe (usually one) and putting up on the bike straps, just plain your SPD-compatible

shoe on top of the pedal and clip in. In an effort to help protect that pedal system, Shimano has learned various shoe companies to make SPD road shoes. This was a wise move, especially when you

consider that Shimano's own shoes are not universally loved. The following guide includes all the companies that are currently making SPD-compatible shoes in the United States.



Lower shoe features like long or short have been minimized. Still, the SH-101 has a 30-degree bend in the sole, and the SH-102 has a 30-degree bend in the sole, and high-top designs. The SH-102 makes shoes that are both SPD-compatible and a double bar and high-top designs. The SH-101 makes shoes that are both SPD-compatible and a double bar and high-top designs. The SH-101 has a 30-degree bend in the sole, and the SH-102 has a 30-degree bend in the sole.



The top 10 SPD-compatible shoes. The Shimano M-100 is the most SPD-compatible shoe. The Shimano M-100 is the most SPD-compatible shoe. The Shimano M-100 is the most SPD-compatible shoe. The Shimano M-100 is the most SPD-compatible shoe.



A new look: the SH-101 and Shimano's SH-101 mountain bike shoe is made in Italy, and the SH-101 SPD-compatible shoe has been fully redesigned. The SH-101 is a multi-use leather combination shoe with the same sturdy leather sole and heavy soleplate. A new design is in the works. (Photo: Shimano)



Made in Mexico, Shimano has been making SPD-compatible shoes since 1989. The Shimano M-102 is the most SPD-compatible shoe. The Shimano M-102 is the most SPD-compatible shoe. The Shimano M-102 is the most SPD-compatible shoe. The Shimano M-102 is the most SPD-compatible shoe.

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advantage for the traditionalist. In fact, in some, and the same will be true for the late-look shoes (SH-101) SPD shoes.

Shimano has worked hard and fairly hard on making the complete SPD shoe, and the same will be true for the late-look shoes (SH-101) SPD shoes. Shimano has worked hard and fairly hard on making the complete SPD shoe, and the same will be true for the late-look shoes (SH-101) SPD shoes.

of your leg foot. This moment is obviously too brief to be in the "no take it back" if you aren't cycling with your feet firmly attached to the pedals, you aren't getting the most out of your leg power. Whether you choose to use SPD, toe-clips or dual clips to get your feet in contact with the road, you aren't getting the most out of your leg power. Whether you choose to use SPD, toe-clips or dual clips to get your feet in contact with the road, you aren't getting the most out of your leg power.



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The rise and fall of isolation gel saddles.

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Temperature can also affect gels. Cold weather thinsens some, hot weather softens others. In either case, they fail to absorb shock effectively. Spenco gel is temperature resistant, so its elasticity never varies. Whether you're riding in the middle of summer or the dead of winter, Spenco gel always delivers the same level of comfort.



Spenco gel's exceptional hydraulic properties don't just absorb pressure—they create a constant, even pressure. That's the primary cause of saddle sores: an irregular pressure.

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If you're still riding a foam saddle, consider this: Foam is a compressible material that responds to vertical forces only. Focused pressure concentrates near the center of the depressed contact area.

Spenco gel, with its unique hydraulic properties, disperses under both vertical and lateral forces. Therefore, Spenco gel produces greater support by distributing pressure uniformly over the entire contact area. Focused pressure points, the primary cause of saddle sores, are virtually eliminated.



Foam Saddle
Foam concentrates under both vertical and lateral forces. Pressure is distributed evenly over the entire contact area.

Spenco Gel Saddle
Spenco gel disperses under vertical and lateral forces. Pressure is distributed evenly over the entire contact area.

The nylon/Lycra cover over is an vital component.

The nylon/Lycra saddle cover doesn't inhibit Spenco gel's ability to perform under lateral forces. The net result is a comprehensive support system that provides equal distribution of pressure.

So, if you're looking for maximum strength pain relief and don't want to carry a gram of excess baggage, ride the lightest, most durable gel saddle. GelFex by Avocet—guaranteed to kill pain on contact.

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GUIDE TO SPD

biggest disadvantage during 1991 for SPD was that, to use the system, the rider had to buy an SPD-compatible shoe, and it's no surprise that the list of SPD-compatible shoes was limited to one or two models (most notably Shimano's design). The rest of shoes and pedals was in the red ink range. Luckily for 1992, prices will come down and variety will go up.

The advantages of SPD are too great to ignore. Since SPD is a double-sided pedal system, the rider doesn't have to flip anything over. All he has to do is step on the pedal (in the right spot) and he will be attached with a click. Even if the pedal doesn't click in immediately you can keep pedaling without having to take your feet off to flip the pedal over. The spring tension on the SPD retention system is adjustable to allow a rider easier entry and egress. The tension can be adjusted on the tool in less than 30 seconds.

Once the rider is attached, he can't help but become more efficient. The feeling of attachment is one of trust, but it soon makes slipping through narrow, slippery tracks into a dreadful thing. And, of course, when the time comes to pedal, the rider's feet are solidly attached to the pedal. He escapes from the SPD system the only way he can: he has to pedal and pedal (and, for the Lank system, "Wig" pedals that houses special cables).

THE COMPLETE & YAKED SYSTEM

Shimano offers three distinctly different SPD pedals. Each one is designed to meet a particular market segment or price range. Shimano not only likes to give products strange names and use acronyms, but they number everything. The three pedals could easily be called Power SL, Power SL and Dura-Ace, but instead they are PD-8020 (replaces the Shimano XT-style pedal), PD-8020 (which is a lower-line version of the 8020) and the PD-8020 (a road-going version and the more Dura-Ace than Shimano).

PD-8020 (Shimano XT) The XT is the top of the line version pedal. It's a standard 480 grams and it is a double-sided pedal that features full and rear spring-loaded release clamps. When you step on the PD-8020 both the front and rear of the pedal retention system spring out of the way to grab the shoe. The benefit of this is that the chain doesn't have to be forced into the pedal to work. All you have to do is press down in the general vicinity of the spring-loaded retention guides and you will be attached with a click. This is the entire PD-8020 pedal to get to and let off.

PD-8020 (Shimano DS) The major difference between the DS and more expensive XT is that the PD-8020 pedal has a rear spring-loaded clamp only. To get into the DS the rider has to insert the front of

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GUIDE TO SPD

the cleat onto a non-moving cassette and then flip down. This is identical to the design of click-in road pedal systems. The SPD is double-sided and Shimano claims that it weighs two grams less than the more expensive SPD-M717. The weight saving comes from the lack of the front clamp. Like the TT7 and SR5 release with the rear cassette of use.

SPD-LS (SR5-AS2) The popularity of the SPD system caused Shimano to come up with what you call SPD pedals on their road bikes, intermediate Shimano that the benefits of the SPD cleat and clamp

system might make it the clearest replacement pedal for all approved Look pedals. To raise and Shimano has released the PD-A520 which a slimmed and thinned version of the SPD standard like pedal. The A520 is a non-rotated pedal since rotation isn't there the same need for a pedal that works on both sides. The A520 is a non-clamp-only pedal, like its mountain bike namesake, but it also has 180 grams lighter. Designed for road racing and touring, the PD-A520 runs like a special SPD-style shoe to complement it.

SHIMANO, INC. SPD ACCESSORIES

Apart from five SPD-compatible shoes, Shimano offers these two models in SPD



Shimano's. The standard shoe has the advantage of allowing the rider to walk on the shoe in systems without the annoying click and chatter of Look. Unfortunately, if you get pedaling mud, unfortunately, you can get the shoe through the mud without getting soaked.

Intermediate is click-in even that allows the SPD pedal to be used with regular tennis shoes, and two distinctly different cleats.

The standard cleat, which comes with the SPD system, is called the Single Release cleat. The Single Release cleat stays firmly attached until the rider uses the heel rock method of release. Since the standard cleat will only come out of the pedal with the one heel motion—it is called the Single Release cleat.

The optional click-in, called the Multiple Release cleat, and it does just what its name implies—it releases under and in all directions. It is possible with the Multiple Release cleat to actually push your foot out of the SPD pedal by lifting straight up (this option is done with the A520 in Mountain Release). The Multiple Release cleat addresses its versatility by having the popping edge of the cleat chamfered. The rounded edges are able to slip in and out of the SPD pedal more easily.

All roads prefer the Single Release cleat, while the Multiple Release cleat is suited to riders who have a fear of being trapped in the pedals. The advantages of the new type of cleats are obvious. The Single Release cleat is more streamlined and clearly releases the rider's foot under the worst of conditions. The Multiple Release cleat allows the rider to get out of one shoe with a strong tug of the foot in almost any direction, but it is more likely to accidentally release while riding.

TIPS • TRAIL RUN SPD SYSTEM
• Don't worry about getting SPD pedals between each shoe. The system works on both high leverage that the most it needs to be for approval with a light lift (1/2").
• Have, 4x140 and two wheel-cleat with a big after every other shoe.



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GUIDE TO SPD

- Clamping is as easy as tuning the pedals with a well-tended, often used ratchet you may have to use a small screwdriver or an Allen key to check fastened road out of the handle.

- Always needs to work on straightening more clearance between the spindle and change to allow dust to escape.

- To sit the cleat up on your shoe you should: (1) back the tension off on the springs; (2) start with the cleat in the middle of the shoe aimed forward; (3) pedal slowly with the cleats lightly tightened in the sole of your shoe, stepping at 12

o'clock and six o'clock to get a feel. Perfect adjustment will have a small degree of flex (flexion) both inward and outward. (4) avoid it flexing the cleat inwardly until you're happy with the feel, because once the cleat is engaged down it is reluctant to be repositioned.

- The further forward the cleat is positioned on the shoe, the more it is to get locked into the pedal.

- Easy to adjust to ride a track, race trials or grinders in the sole of your shoe to make more clearance for the cleat to work with. Some riders get a wide swath to make entrance into the pedal easier.

- It's not necessary to get your foot locked into the pedal immediately. Start

pedaling with your foot on top of the pedal and it will normally lock itself in without any effort.

- On occasions when you want to pedal without being locked in to give clearance to rocky terrain, the best approach is to lock your heels in closer to the frame to re-align the cleats. Unfortunately, more than one rider has released his feet when approaching a difficult section only to find a stick a second later. They are so easy to get into that they are hard to get out of.

- If you have mud on your shoe or pedal, the best way to get the SPD pedal to hook up is to trim your feet as though you were stepping on a cucumber.

- On super good days, SPD pedals will sit up for more rides you are better off with wedges.

- Don't get in the habit of looking down to see if your feet are in, it takes about six weeks of steady riding to become an SPD pro, longer if you look at your feet.

- Accept the fact that you will fall occasionally during your SPD training period (time spent riding with Lock pedals on the road doesn't really help). First-time SPD users fall because they are thinking about the pedals. They worry about whether the pedals will release, and instead of concentrating on riding they waste energy doubting their own ability. Think pedals, stay locked in and the Lurch in period will pass.

- When you want out of SPD pedals, you need to press down slightly before twisting your foot sideways. Pressing down releases the retention system.

- If you don't like being locked in, but still want the coolness factor of riding with SPD, then have your cleats on the new Multi-Release cleats. It's easier to use, and while it will pop out accidentally occasionally, it's easy to get out of. Don't worry—you are well over how you are using the ratchets.

- SPD pedals have a measurable amount of flex. The flex allows the pedals to fight themselves and takes unwanted pressure off your knees.

- On your first few rides with SPD take your feet in and out of the pedals constantly. The more times you do it, the better you will become. Since SPD is easy to get locked into, the hardest thing to master is getting out. So the reaction on the lightest setting and take dates everywhere. Practice makes perfect.

- SPD is perfect for riders who can't hang-lop. With your feet locked in, even the most unskilled rider can get the rear wheel up in the air. Additionally, you can have one foot in when you come to a stop on a descent and step across with the first foot and let the bike with your SPD leg.

- The best thing about SPD is that they are so easy to get your feet locked into, the worse thing about SPD is that they are so easy to get your feet locked into. It

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When a bike can do without the advertising



It's in the name: One of the best parts about buying a Specialized bike that costs as the least here on the market are the excellent customer service. At \$1,799, the Stumpjumper FS was the lightest production suspension bike we have tested—and it could easily get lighter.

With a dominating, globe-trotting race team and slick advertising that announced the company's goal with television MTV-like videos and two-page color spreads found in industry and consumer magazines, Specialized has been a company that appeared to be at the forefront of the mountain bike movement. Looks can be deceiving. Though the Morgan Hill, California, company may have been one of the top sellers last year, something was missing. To us it appeared that there was simply more effort being put into the image rather than the product. The CAD (computer-aided design) revolution had stagnated at Specialized with no revolutionary results. Year after year the new models would show up at the bike shows with only subtle changes underneath the new graphics and colors. It's not that the bikes were bad, they just weren't all that exciting. At the '92 bike show Specialized found itself without a competitive bike to even show off as a prototype. With suspension already a proven commodity and frame requirements, it was a mystery to the perceived off-road masses and elites.

Apparently, company founder Mike Tinker was tired of working around because last year he launched the S-Works division of the company. The aim of the in-house design team was simple: to recreate the lead in product development. No longer would the many hours spent in front of a computer CAD screen be merely enough for "sketching" or "bit understandings" to be made. He was after new ideas and, most importantly, new products. The design team went to work. It's hard to do it, get all the F&E (fitting in the real and wonderful—another phrase).

WORKS-WORKS REALLY WORKS!

To prove the point that the S-Works concept was a brand apart from the Specialized lineup, they created a separate catalog for their '92 product. Full of high-end, high-performance accessories and complete bikes, the new approach appeared to have paid off. In last year's bike show the dealers seemed more interested and excited than in years past.



Quick Stop 2™

Lightweight suspension brake with 100mm brake arm, main adjustment, quick-release cable with replacement. Light has larger brake pads than other brake models. Two models designed by Olympic fitters.



STRADDLE ROD™

CANILEVER BRAKE CABLE CONTROL



Designed by Italian fitter

The suspension brake provides superior response and maximum control. Innovative canilever cables for positive lockup and fine control. Best of all, left and right cables can be used independently for perfectly centering all 4-wheelers, even without top, lightweight construction.

3000TX™

Designed by US

Can brake power for other with canilever. 3000TX has heavy 3000TX brake and the difference (rate) you actually maintain it during your time without getting over-tired. 3000TX and 3000TX also give you a smooth stopping ability and control. The 3000TX brake cable is made for the best for additional low resistance and for its resistance without extra weight of weight.



Designed by US

High quality suspension with positive locking system. The 3000TX is designed to improve your control and performance. The 3000TX is designed to improve your control and performance. The 3000TX is designed to improve your control and performance. The 3000TX is designed to improve your control and performance.



The 3000TX

The U-Plate

The 3000TX

The U-Plate



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THE

POWER

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SERIES

SPECIALIZED STUMPJUMPER FS



SPECIFICATIONS

Model	Specs	Frame	Color
Specialized Stumpjumper FS	29" x 2.1" (700c) x 2.1" (700c)	Aluminum	Black
Specialized Stumpjumper FS	29" x 2.1" (700c) x 2.1" (700c)	Aluminum	Black
Specialized Stumpjumper FS	29" x 2.1" (700c) x 2.1" (700c)	Aluminum	Black
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Specialized Stumpjumper FS	29" x 2.1" (700c) x 2.1" (700c)	Aluminum	Black

NOTE: The SPECIALIZED STUMPJUMPER FS is a full suspension mountain bike. It is designed to provide maximum control and performance on the most demanding trails. The suspension system is designed to provide maximum control and performance on the most demanding trails.

Gain on the trail. Lightweight lightweight for a front suspension bike, the Stumpjumper FS climbed hills easily, or easily, or it descended them, when it did take well. That's the way it was designed to be.

Everyone wanted to share a sense of new found enthusiasm for the newly designed product line.

However, as easy as it was to park a new bike from the 3000TX-2000TX line, the feeling was not the real thing. The real thing was the 3000TX-2000TX line. The 3000TX-2000TX line was designed to provide maximum control and performance on the most demanding trails. The suspension system is designed to provide maximum control and performance on the most demanding trails.

WILL YOU TRY IT, OR DON'T TRY IT?

Our Stumpjumper FS is one of our bikes that come equipped with Specialized's new Future Shock suspension fork. The new Future Shock suspension fork (the only fork that is 100% new) is designed to provide maximum control and performance on the most demanding trails. The suspension system is designed to provide maximum control and performance on the most demanding trails.

But instead of just throwing a suspension fork on an old frame designed for the lower height rider, it was designed to provide maximum control and performance on the most demanding trails. The suspension system is designed to provide maximum control and performance on the most demanding trails.

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SPECIALIZED

In a Targa devoted to one aspect, the bike had a complete list of basic mountain bike hardware: rear dropout system, leader and rock mount and a chain hanger. Nicely shaped, double-tapered seat stays accompany rectangular 26.1-inch chainstays. Rear wheel clearance is very good and Specialized tells us that the maximum 2.5 diameter tire can be run without problem. For the first time, and only because the bike is using a suspension fork, Specialized has upped the size of their leader from the traditional one-inch size to a bigger 1.125-inch.

COULD ALL THIS BE DONE?

Specialized is one of the few companies to make the massive marketing push to use Shimano Regulus' drivetrain. This year's top-end bikes have once again managed to come equipped with top-mount shifters. ("Bandwidth" was just as viable as ever before, remember the friction shift mode? Independent adjustability between the duster and leader lever?), and through an eye's use Specialized holding out much longer in the battle to retain technology that distances from all but frequency, we even happen to see that they used what mounts they have in use when they park. The FS is equipped with a Shimano Deore LX gripper. While not



Time to change. For the first time, Specialized has gone to an oversized stainless steel for the suspension fork, the FS designers thought it would make sense to add more bearings. Specialized puts good marks for using a top-rate steel which perfectly demonstrates the higher front end raised by the Future Shock.

THE ULTIMATE UPGRADE

Just 28.8 grams.

In a Mountain General™, Mountain Specialist and Great Trail™ and Great™, now available from Klein's™ new line of mountain bikes, the Mountain Specialist™ is the only mountain bike with a 27" stainless steel frame and 27" stainless steel wheels. It's available in three finishes: black, silver, and gold. It's available in three sizes: 26", 27.5", and 29". It's available in three colors: black, silver, and gold. It's available in three finishes: black, silver, and gold. It's available in three sizes: 26", 27.5", and 29". It's available in three colors: black, silver, and gold.

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It's not a snake oil scam here. It's a "snake-oil" scam. They take you back for a snake-bait and sell you a bag of nothing in a cage. You're the "oil" to go with their oil.

So, you know how to go. You're looking for a snake-oil scam. You're looking for a snake-oil scam. You're looking for a snake-oil scam. You're looking for a snake-oil scam.

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You see our Specialized's forks show off their design (and) from their. They're designed for their frame. But the forks are not made by their frame. The Future Shock's fork is all about your comfort. It's a light riding fork to their active suspension that works over small and big bumps.

Springless FS lock and fork through the wheels will prove that this is one bike Specialized didn't leave in the capable for its light by itself. It's all about your comfort. It's a light riding fork to their active suspension that works over small and big bumps.

Though they called them an "active suspension" or "Future Shock" fork, they provided quality suspension travel without a loss in precision steering. For riders in the 120-pound range, we can see the fork at 40.13 lbs. The rubber inserts may add a tad of weight, but they will protect your fork and tire by keeping you on the fat and firm.

Last but not least is the bike's weight. There are two frame sizes that the big bike companies will be judged by in the bike to produce properly designed sus-

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SPECIALIZED

precision fiber. The first in maintaining the proper geometry. Specialized proved that too. The second is whether a fiber is able to maintain a reasonable reading as the time goes by. We were happy to see the Forcepawer FX weigh in at only 11.5 pounds. That's exceptionally light for a 100-watt-hour rated fiber with these dimensions. In fact, it's the lightest fiber we've ever produced. And we have more to say. With maximum rigidity in just minutes of cure suspended fibers that weighed in for more, it was a good sign that Specialized is trying to do something about the weight factor. They passed the second test, too.

IN THE END

Designed with performance in mind, the Forcepawer also makes an excellent recreational fiber. Backwoods exploring and camping will be made all the easier with the full assembly of (1) 100-watt-hour accompanying the Forcepawer. But wait! The Forcepawer FX is by no means the new direction we open by Specialized in leaving some very first. The FX is a sturdy, weather-resistant fiber that has enough features on it to keep the rider excited and pointed in the right direction. This is one fiber you don't have to rely on the advertising to feel good about.

AVOID A TREE IN YOUR FACE



Anti-cock caps (not shown)

The only thing you should notice about a great grip is comfort. That way you can concentrate on more important things such as that tree coming at your face.

(For those without bar ends) to prevent the ends from tearing. Zip tie grooves and ties were also included to keep the grips from moving.

Designed with the Porcupawer grip with the help of many top pro racers to be the most comfortable grips available.



Internal seal and zip tie groove to prevent bar ends from tearing.



We reduced the diameter to a minimum to eliminate the dreaded "hard pump".

And something no other grip offers. Two internal seals were added in each grip to prevent moisture from entering when using bar ends. By the way, remember that too! If you're wearing it — Porcupawer.

See how easy it is to install with our Porcupawer.

We used the finest RIMMEX compounds available. Also the on's and Porcupawer were placed in such a way so the grips can be used with or without gloves.

See how easy it is to install with our Porcupawer.

We included anti-cock caps (not shown).

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GUIDE TO CARING FOR YOUR BIKE

Mountain bike maintenance made easy

By Steve Hovell



Mountain bikes—like small child toys—are supposed to get dirty. "It was outside 'n' play," most tend to say. And mountain biking is a glorious, messy celebration of your right to get dirty. So go 'n' outside...where the pavement stops, legs fly in the wind...which means in mud, dirt, tooth powder and sweat through rocky trails. Off comes, more things lead to an old-fashioned shower, where dirt cannot be found. We

garageps will be having our fun and taking our punishment in an expensive pool of equipment. Here's a good example: this bike is designed to perform daily wear-and-tear cycles of torture for long periods of time, but that doesn't make it immune to the effects of such exploits.

Like everything else in life, engineering to care for your mountain bike will eventually take all the fun out of your off-road experience. Remember, you can take a lot

rather than you would care to walk, and since your mountain bike is your ticket to adventure, it only makes good sense to spend some time making sure that everything is in running order. This month we look at three parts of the bike that reflect most basic preservation: the drive train, wheels and headset. Common problems with any one of these on the road will make your ride your last, even a little more time "mechanic," in the garage. ☐

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superior fork, the Bravado makes even the most radical descents feel like a walk in the park.

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But, as good as all this sounds, you gotta prove it to yourself. So visit your GT All-Terrain dealer for a test ride. And see if the attitude fits. Call today for the GT All-Terrain dealer nearest you.



HOW TO CLEAN YOUR DRIVE TRAIN

If you ignore it, it won't ignore you

When your bike's drive train gets clogged with grime, you will notice that easy shifting disappears. Your bike shifts, but only after repeated clicks or even a little roll by itself (you're dead right). The cure is proper cleaning and lubrication of the chain and derailleurs. The caution is that the art of lubing your parts can quickly lead to another headache: too much lube is left! Anyway, the following steps for cleaning your drive train should be performed at least once a month, though the amount of riding you do and the weather conditions you ride in might make the process a more frequent necessity.

STEP ONE: PREP UP

Due to the dirty nature of the job, and the use of chemical solvents, it's advisable to do the entire cleaning and lubing process outdoors with a piece of cardboard underneath the bike to prevent staining. Once the cleaning area is prepared, you'll need the necessary tools for the job. While the job can be done with an assortment of household items we suggest using one of the cleaners from cleaning systems that are designed specifically for the job. The more popular cleaning kits on the market are made by Ima, Skully, Finish Line, and Park. The Ima and Skully kits include citrus-based solvents that are both effective at cleaning away the grime and environmental by side. There are several different companies that offer citrus based degreasers, but only Ima and Veda offer systems that include special brushes, towels and comb-like tools to clean the hard to get spots. If you do not have one of these cleaning



Proper cleaning with brushes and towels and comb-like tools can reach the hard to get spots that are the hardest on your gear. You can get the chains and tools on an all-terrain bike and clean your gears as well.



The cleaning system cleaning your bike includes getting your handle bars sprayed, appearing, right? There are several items that provide you more cleaning options. Ima's system includes Finish Line Cleaner and the Park Chain Cleaning System. For example, these products are the easiest ways to clean your components. They come complete with towels, brushes and tools.

systems there is a wide brush and scrubber and an old-tooth comb to use to get in the crevices. You can also wrap the chain with a rag and then rotate the pedals to the hand-held rag will remove surface grime.

STEP TWO: IT'S A BIRDY JOB...

It's important to use the little plastic nozzle tube that comes with most degreasers because it keeps the high-pressure spray from spraying the parts of your bike that don't need to be cleaned. Before you start spraying any cleaning oil on the brake pads or rim braking surface). The directed spray also does a better job breaking loose the clogged mud. Spray your degreaser in between the gears and along the outside chain, including the inside of your derailleurs. Wait for several minutes for the solvents to take effect and repeat the spraying. Now, use your comb and brush and scrub away any excess grime that may be between your gears and the hard-to-get spots of your derailleurs. You may spray your chain and the chain-pads for front spraying directly into the bottom bracket. If the solvent finds its way into your bottom bracket it will break down the grease and leave your bottom bracket dry and unpowered from the inside out.

STEP THREE: WIPES DOWN

This is where the towels and rags come into play. Take the towels and wipe away any solvent left on the components.

Spraying the drive train clean with water for the final step of the cleaning process works well, but it is not advisable unless you also have access to a high-pressure air hose to blow away all remaining water droplets from the parts. Once you have the components as clean as possible, remove the rest when:

STEP FOUR: LUBE TIME

There are many lubricants on the market and finding the right one for your riding conditions can be confusing. The cold, wet climate a hour-long day of a season, muddy or wetland mud, sand, stream crossings and more conditions. For most conditions you want a thinner lube that can work itself into the rollers of your chain and the points of the derailleurs. Synthetic-based lubricants, which act and protect the parts and ward off dirt and dirt are popular. Lubricants like this are good for long-distance because they spread and leave a waxy film on the surface for long-lasting protection. Get your local bike shop for a lubricant that works best in your area's climate and road conditions. We have always had good luck with the lube offered by Ima, Lube and Pro's.



The degreaser, the better. Use a brush to spray off any remaining solvent. What you have remaining for cleaning purposes, take the chains and gear to get rid of any excess lube that may attract dirt.

When it is time to lube, make sure to use the nozzle extension tube that comes with the typical can of spray lubricant, because it will help the oil penetrate to the more recessed surfaces of your components. If you're using a lube that is in a spray bottle, apply the liquid to the chain over the gears to any excess spray on similarly lubed parts. Read the instructions that accompany your lubricant on how to apply the proper amount for optimum performance. An easy way to lube your chain is to shift the chain to the top of the rear gear and use your chain backwards using the right pedal. Then spray the entire chain and use a towel to wipe off the excess oil.

When you're done, you'll have a clean, well-lubed drive train that will help you get the most out of your ride. Remember, a clean drive train is a happy drive train. So, next time you're out on the road, take a few minutes to clean and lube your bike's drive train. It'll make your ride a lot more enjoyable.

For more information on how to clean and lube your bike, visit us at www.bikeaction.com. We'll have all the information you need to get the most out of your ride. And, if you're looking for a new bike, visit us at www.bikeaction.com. We'll have all the information you need to get the most out of your ride.

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HOW TO TRUE YOUR WHEELS

It's a common problem, but it's not always obvious. If you're having trouble with your wheels, it's time to true them. Here's how to do it.

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HOW TO TRUE YOUR WHEELS

*if it wobbles,
you need to fix it*



It starts the work. Over an 8- to 10-in. span, the spokes are 1/16-in. apart. The spokes are 1/16-in. apart. The spokes are 1/16-in. apart. The spokes are 1/16-in. apart.



Always bring along a spoke wrench when you're working on your wheels. The spokes are 1/16-in. apart. The spokes are 1/16-in. apart. The spokes are 1/16-in. apart.

You've probably experienced something like this at least once in your riding adventures. One of your friends is riding closely behind you, not saying a word. Suddenly your buddy opens a lovely single track crying out in his misery. He reserves no deep in the service, but he's forgotten one thing—he's dragging your seat into **WILDMAN!** His front wheel takes a new round—you can adjust. Then shift a bit to the right to the opposite side of your bike because your buddy is going over the bars for a last test of your back seat's rubber compound. And you've struck with a hand wheel that looks like a wire saw without the cutting.

Sometimes you'll find a wheel as badly it has to be replaced with a new one. These steps are for straightening your wheels after minor incidents, but they can also help you get out of trouble after a major incident in the contest, or help you in straightening the spokes of a new wheel. Don't try to tighten your spokes with anything but the properly sized spoke wrench. The two most frequently used spoke sizes for mountain bikes are 14mm and 15mm. This measurement is determined by the diameter of the spoke nipple.

STEP ONE

WHAT ARE THE SYMPTOMS?

Whatever side your rim is bent on now has loose spokes, while the spokes on the other side of the wheel are now overly tensioned. You can also notice a slightly bent wheel, but you are taking a big risk of the tire rubbing on your brake shoes and wearing a fine line into the sidewall of your tire, which can lead to a flat tire. Another type of bent wheel comes about when you have a brand new wheel and you just get on your bike every day and hammer without even thinking twice of how tight the spokes are. Brand new wheels are just like your dentures and brake cables in that they loosen and stretch when first used. Wheels are occasionally subjected to stress from you pedaling, which can gradually loosen the spokes. The wheels are also subject to constant side loads from rolling over rocks and ruts.

All this may be too if you spokes are tight before you ride is to tell them with a wrench or screwdriver. Tight spokes make a sharp ping, while loose spokes make a dull thud. Pacing the spokes together is another way to check tightness.

STEP TWO: THE TRUTH

When it's time to start working your wheel, it's best to leave your wheel on the

bike and use your brake shoes to check the truing accuracy. Next, spin the rim slowly to see if it wobbles in contact with your brake pad. The rest of the rim that hits the pad is where the wheel is out of true. If the wheel is unable to spin freely you can loosen the brake adjustment to give the wheel more room to spin freely.

Now, locate the wheel slowly until you find the section of rim just starting to make its way over to the brake shoe. This will be your starting point. Wrap your finger around the spokes closest to the head to keep track of the spot. As you continue rotating the wheel, watch closely for the point where the rim returns to its normal position and then will be your ending point for the rest of the rotation.

If the rim is contacting the brake pad on the right side, you'll want to tighten the spokes that run from the hub flange on the opposite side. This will in effect be pulling the rim back, away from the brake pad. There is usually a minimum of five that is bent out of shape, so a couple of spokes will need to be turned. Give the bottom spoke's spokes half turns at first by turning the spoke nut counter clockwise to tighten. It may take more than a few half turns to get the head out, so repeat the process slowly on the spokes here a chance to stretch evenly. A rule of thumb is make sure you're tightening the correct spoke is to tighten every other one. When you have noted that part of the rim to your satisfaction, give a handful of the spokes and give them a quick adjustment. This will help on the spokes in place.

STEP THREE: PULLING OUT ALL THE TURNS

When you notice a severely protruded wheel which can't be straightened by using the wheel, you options remain that is to take the wheel off the bike and clean the head section of rim against the ground to bend it back straight. It sounds dumb and looks even dumber, but it works. You can also press the side against a row or rock and give the wheel a couple of hours in the head section to get most of the damage out. Then tightening the opposite side of the head with half turns and slowly loosen the right spokes from the other side by half turns to give you more to work with. These tricks still may have to be followed after all this effort because the rim may still rub on the brake shoes, but it beats walking home. This tip is not guaranteed to get your wheel fully true to perfection, and you will eventually need to replace your rim with a new one, but it has gotten the little winking row out of most tough situations.

Mr. Miyata would like us to announce our brand new line of mountain bikes. We have done a very good job with them.

HOW TO ADJUST YOUR HEADSET

Does your bike have index steering?

Besides your front fork, it is and inside the steer tube that give the most flex in the headset. You should check your headset once every three years... or more frequently if you ride in a lot of wet weather. These simple-to-follow steps for cleaning and adjusting your headset will make the job a breeze and give you maximum safety of reliable front-end steering.



Focus on the job of upper headset adjustment and headset lock will be what you need to handle and tighten your headset. The number may be within... adjust the headset... by turning the front fork between your legs.



particular or oval. You can also use an old tooth brush to get into the hard-to-reach spots.

STEP FOUR: IN WITH THE CONE
The first way to adjust your bearings is to take a finger full of grease and wipe it down inside the bearing. When the grease is forced through the bearings, it does a really good job of the job. In this case, I use the inside of the bearing caps.



Some kinds of cones... A simple way to keep track of your headset parts is to place them in a zip-top bag in the order that you disassemble them... if you're adjusting cones.

with a few layers of grease on each. This will hold the bearings in place when you're loosening the lock.

Now, place the bottom bearings down on the fork and install the lock. Place the top bearings back up and screw the capset on down onto it so that it is snug. Screw the lock nut down on top of the capped nut and install your stem with a light layer of grease on the stem shaft, wedge and stem lock.

Check your headset lock and place it on the capped nut. Position your headset wrench on the fork nut and slowly turn the crownset towards that you while holding the headset wrench in place. Now unscrew the bike and give the front brake. Rock the bike forwards with the front brake engaged lightly. If you feel a knocking sensation at the headset, it is still loose. Loosen the top lock nut and turn the bottom nut a little more, and then tighten the lockset. Repeat the process of rocking the bike, and adjust the nut until the knocking is gone.

There is one last one you can try to make sure the headset is properly tightened and not rubbing from what is known as "index steering." Lift the front wheel off the ground by the handle and use it as the wheel falls to one side... it should. If the theory is so many knocking sensation and the wheel falls freely to the side you're ready to ride. **Q**

STEP ONE: BREAK OUT THE... **Q**

There are three to... up for this job, a large... is a headset wrench and an... The Allen wrench is used... and remove the stem... the nut and cone. Headset dimensions come... 1 1/2", and 1 1/4" stems, so you will need a 15mm... 15mm stems respectively. Grease will be the key item for this job. You'll want a heavy-duty synthetic grease which consists of anti-friction and waterproof ingredients that will hold up to adverse riding conditions.

STEP TWO: LET'S GET DEEP TO BUSINESS

The first thing you need to do is remove the stem. Sometimes the stem will get stuck inside the crown set, but if the stem is stuck, use a hammer will break it loose inside. Now, loosen the top locknut on the headset and unscrew each piece (some headsets use stem locking nuts and washers that allow). Remove the top and the headset cap on the headset. Being careful of the bearings, which will probably be stuck on the inside of the headset cap. Now you will have to release your brake cable from the lever within the frame, so slide out of the head tube. Keep a clean eye out for any small rubber seals that may be used in the headset. The best

thing to do when it's time to reassemble your headset make sure you install the bearings with a heavy-duty, waterproof grease. Remove the grease on the bearings with some paper and clean off the stem side. Apply a light amount of grease to the bearing cones on each.

way to keep track of which way the parts line up is to stick them on top of each other on a rag. Clean the cone like a disk cap that houses the ball bearings at the bottom of the crown set with a rag. Check the cone for smoothness by running your finger by around the inside. If the surface is rough, that is an indication that there is bearing damage, and a new headset is recommended. Also, check the bearing caps for surface cracks or if the bearings are so loose that they are on the verge of falling out... both signs that a new headset is needed.

STEP THREE: GET WITH THE... **Q**

You may clean your headset parts with degreaser spray. When you are ready to clean the bearing caps, make sure to spray the inside of the caps to get rid of the old grease that may contain some oxid

We can think of only one instance where Mpsara bikes may disappoint you. And that relates to the fact that they are so well made (with tubing we manufacture ourselves, precision cast lugs, and our exclusive ABS bonding) that you will no longer need or want a new bike every ten minutes. So if you're into that kind of thing, you may not particularly like our bikes.

BREAKING THE BOND WITH PRODUCTION BRAKES

Two new systems thwart a conspiracy!



You can be sure that at the very moment you are reading this there are some people, somewhere in the world, plotting. Unhappy with the current state of affairs, they are devising an intriguing scheme to turn world order where their vision of how things ought to be will one day come to pass. No, we're not talking

about some back-porch gathering of ill-disposed Bay of Pigs survivors, or the conspiratorial activities of some psychics who think Elvis Presley is still alive and roaming the state of affairs from a mysteriously sunny cabin in the Atlatlancho. We're talking about a very real collection of assorted faces who believe that the latest

new device when you read where "having good brakes is an important part of mountain riding—some minor ones" mentioned their entire library of titles before on your bike won't bring the kind of releasing that leaves you feeling safe, since it does an awful lot of work (being offered by designer Miyata and First Engineering.

BRAKES

We are fortunate enough to have come up with a promotional idea that is advantageous to you as well as our company. All you have to do is collect four Miyata ads (so we'll get you to read more of them), bring them into any Miyata dealer (so we'll get you in front of our bikes), and you'll receive a handsome Miyata T-shirt (absolutely free!). Here's a quick drawing of what they'll look like when completed. We're still printing them up.



You can see how this should work out well for both of us. To find your nearest dealer, call 1-800-325-8555. To find more of our ads? Your first step should be page 95. Now get busy and start ripping this magazine apart.

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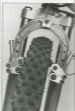
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BRAKES



Only one finger-mounted Brake's built. Girvin Disc Brake offers some of the best stopping power at any cost/price system we have ever used. The vertical brake piston allows for a wide variety of locations, and adjustment is incredibly easy. We use the brakes on a pair of Road Bikes and most American's Water Skiing tow boats. What shaped this? Not the air.

of off-road braking systems too with the disc brake. "Oh, sure," you say, "there are already disc brakes on the market, why should we worry?" No, worry up, will you? We have a collection of first-hand accounts that will reveal that the industry of large, as well as a host of private organizations, already have several disc brake prototypes being test ridden. A handful of both experienced and novice Designers are drawing up new designs that will work in conjunction with disc brakes. Our brakes are coming, believe it or not.

Fortunately, just as there are those people who don't believe the findings of the Warren Commission's investigation of John F. Kennedy's assassination, and who won't have their opinions settled until the year 2021 when the official papers are released, so are there those who refuse to sit idly by, waiting for water heaters that when disc brakes finally find their way into the mainstream of the motorcycle rider's psyche. These are people, like those found at Boulder Bicycle and Pad Engineering, who are simply not content to wait and see what form of brake system will be delivered to us in later years. They have their own ideas, their own technology, and they want you to believe in it.



Add suspension and lose weight!

Want to go faster on the road with more control? A Girvin Disc Brake absorbs road shock, reduces fatigue and saves weight - making you lighter. What's more, a Girvin with water your pedaling forces, change your bike's critical look.



govern, or weight you down. Put your bike on the "supermarket shelf" - your top priority around the world are heading in. Per one are, lightweight Girvin Disc Brake, today!



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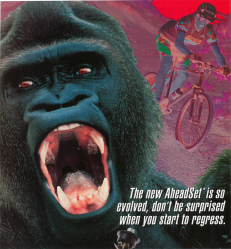
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The new AheadSet[®] is so evolved, don't be surprised when you start to regress.

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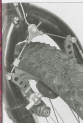


AHEADSET

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BRAKES



When you see the overall shape of the lightweight, 2000 PSI aluminum brake made by West Component Engineering, you know it's one and a half-ton job. Using the same metal with some plastic. Though the modification was not a lot on the heavy side, the composite breaks and worked smoothly.

NO-COMPLAINT THEORY

Due to a long year in the evolution of fully suspended mountain bikes, aluminum composite systems are currently all the rage. Properly working composites can play a big role in the overall performance of suspension bikes as far as the suspension system is concerned. However, don't think that aftermarket composites are aimed solely at the suspension bike owner.

A few modern brakes are for anyone who is not satisfied with the offerings of Shimano, Sun Tour or Shimano. The backward brake systems are the perfect answer for someone who is not only looking for a way to personalize their bike, but also to get it to stop faster. No doubt the majority of our users are big fans of public transit, unless they could not afford Shimano's first world up the industry. If you have ever sought a brake system beyond those offered by the likes of the big three manufacturers, you won't be disappointed. Working for us—designing the future in the composite brake. It's the best news available. Working systems for mountain bikes, single, light weight and efficient—what more could we ask for? The likes of Boulder Bicycle and Paul

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"THE BRIGHTEST"	Merely, (3.0 watts max)
"BURN UP THE NIGHT!"	2.4 x 12.4 watts AAAA (We need to start '97)
"LIGHTWEIGHT LEAD ACID BATTERIES"	If you believe the one I got a "lightweight" boat anchor for sale
"NICKEL-CADMIUM MEMORY PROBLEMS"	"Nickel Memory" is a subtle metaphor during memory a problem with—can't a grand 4.750?
"BEST VALUE OFF & ON ROAD"	80-100 for 1. 10 lights and a 10 best alternative. Reserve flashlight unit separately.
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BRAKES

Engineering apparently asked for more and their superior brake system, the Boulder Quick Adjust and Post Component Engineering Straightlines, are the answer. They came up with **THE BULLSEYE**

THE COLORADO 4130 STEEL 96-00mm being considered responsible for the increased speeds being attained by people riding their fully suspended mountain bikes. Boulder Bicycles defined their new Quick Adjust cantilever brake at just 188% Mountain Bike show. The Boulder's lever arms, which could just as easily be called Q.A. Adjusts, mount onto new vertical alloy posts and have two inches of vertical adjustment.

If you happen to be one of the many people running Road Shows on your bike, you might be interested in another accessory product called the Boulder Trail Turner fork levers. The machined aluminum levers, which help maintain the torsional twisting of the suspension forks, weigh eight ounces and retail for \$99. The forks at Boulder say they are working on an issue for Mountain Bikes as well, though to release this has been an **IMMENSE TASK!**

While testing it always an experience in line and repetition. The only way to see how good a brake works is to go fast and pull. With the Boulder brakes, this could be a digital experience and the rider knows just how little pull is required to make the brakes stop, not slow, the bike. The brakes maintained very efficient modulation. Each pair of levers comes with a new pair of Super Performance brake pads, and they do make a nice job in making the brakes work good stops.

Despite the best efforts of the other brake collaborators, they will have a very long way to go to fast and the braking consistency of the Quick Adjust Brakes and Trail Turner fork levers. As to road shows, the Boulder brakes are among the very best we have ever experienced. The brakes weigh eight ounces a pair and retail for \$129. For additional information, contact Boulder Bicycles, P.O. Box 1888, 11pm, CO 80111, (303) 252-6333.

WHEELS UP WITH PAUL!
Paul Price is the man behind Paul Component Engineering. We first heard the name when we saw a prototype pair of his brakes and quick-release shrouds around an equally prototype Mountain Bike suspension bike at Mountain Bike show. A mechanical engineer, Paul has spent the last ten years in the bicycle business, including a stint at Mountain Unit, prior to going off on his own.

Paul's Straightlines built to the bike frames, combined the Boulder's, they don't have vertical adjustment. The super flex-profile design means that they stay on



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BRAKES

of the foot's way over its usual function. When discussing the thoughtless way an eye can be placed on the push-colored spring on each set. On both the front and rear it should be on the right-side brake. After we installed the brake we spent considerable time trying to figure how the brake was supposed to work - because they didn't. We gave a call to Paul, who told us to raise our eye spring adjuster (see page 7) for increased tension. Once we did that and re-tightened the assembly on the brake post, we ran the available cable and away we went. As because a serious mechanic with our test riders, the first one to try the Shoghtless handled on his local riding sessions of taking off. The modification wasn't as light as we would have liked, but it was still very effective. "We ran a great pair of Shimano's to take push and the bike stopped on a dime. It's a real fun to ride!" - Mike Miller, Shoghtless. Shoghtless are available in either black, powder or stainless steel (see choice standard finish). The weight for a pair of Shoghtless is seven ounces, and you can get them for around \$140. For more information contact Paul Component Engineering, P.O. Box 4820, Chico, CA 95921, (916) 342-1171 x12.

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MOUNTAIN BIKE ACTION TEST

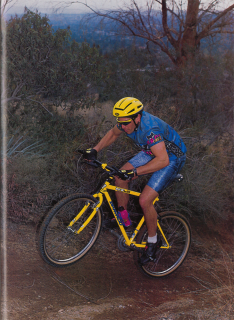
GT ■ For years now GT bicycles has been
 occupying the position of the industry
 leader for the hardcore side of the sport.
 Always aggressive in pricing circles, this
 may be the year when they find a great
 chance to advance that goal. Without a
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most talented racing team. The team, con-
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 ing, and company founder Gary Vantor
 spends most of his free time strapped into
 his top full shogles, racing on quarter-
 mile circuits across the country. To be
 sure, the spirit of the company is based
 on competition.

This same spirit goes into the popular
 GT line of mountain bikes that have
 been—since they were designed for the
 hardcore rider. "We want our first GT



KONA



...main bike for the January 1992 issue of *MSR*. Things have changed quite a bit at GT in five years. The most noticeable change is the triple triangle frame design which is now (1992) the year you can no longer find GT's trademark. Other things that make the GT line stand out are the several ways they try to cater to the needs of any prospective buyer with items like the Flip-Flop stems, adjustable SR derails, and Presto tubes with Schrader drilled ends. As consumer needs have grown over time, GT has attempted to keep pace. Our 1992 Bravado test bike offered some of the same attention to detail that we've come to expect and appreciate from GT.

IT'S IN THE FRAME:
Though they have retained the inverted design of the triple triangle frame, over the years GT has pursued higher quality materials to make frames. The Bravado's frame uses a First Tempco GTS Ultra 88 tubing. The head tube still uses aluminum, but the seat tube, with its GT reinforced wall cap, is still powered by the steel tube.

New for this year is their exclusive Geomet Tube top tube design. The traditionally formed tube now has a greater run-way along its underside to accommodate the front and rear derailleur cables plus the rear brake cable. Though the biggest gain here is a visual one, the tube put into it again points in GT's conservative approach to building their means in bikes. Also new are the replaceable toe



We quite adjustment here. We have never seen any form of GT's replaceable offset 32 mm crownbar, especially when you think to maintain your location if you want the adjustment the front position in the rear position. It's a sure sign, but really not too unusual. However, handle bars and stem-assembly steps 88-100-0100 were well received for their appearance and function.

...bracket longer and rear dropped with vertical adjusting screws for wheel alignment. We were's too late on the adjusting screws; in normal use on the proper rear wheel alignment should come from the factory and not be something to be re-adjusted for every wheel.

ABOUT THE BIKES:
Our 18-inch frame test bike performed 15% increased at 19 inches but 15.2%

GT BRAVADO

SPECIFICATIONS

Model Number	GT Bravado 18" (1992)	Head Set	GT Headset
Manufacturer's GT	GT Bicycles, Inc., Irvine, CA 92614	Stem	GT Stem
Material	Aluminum	Handlebars	GT Handlebars
Weight	12.5 lbs.	Front Derailleur	GT Front Derailleur
Price	\$150	Rear Derailleur	GT Rear Derailleur
Frame available in 4"		Shifters	GT Shifters
Top Tube	Aluminum	Front Wheel	GT Front Wheel
Head Tube	Aluminum	Rear Wheel	GT Rear Wheel
Seat Tube	Aluminum	Front Derailleur	GT Front Derailleur
Seat Post	Aluminum	Rear Derailleur	GT Rear Derailleur
Stem	Aluminum	Shifters	GT Shifters
Handlebars	Aluminum	Front Wheel	GT Front Wheel
Front Derailleur	GT Front Derailleur	Rear Wheel	GT Rear Wheel
Rear Derailleur	GT Rear Derailleur	Front Derailleur	GT Front Derailleur
Shifters	GT Shifters	Rear Derailleur	GT Rear Derailleur
Front Wheel	GT Front Wheel	Shifters	GT Shifters
Rear Wheel	GT Rear Wheel	Front Wheel	GT Front Wheel

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GT BRAVADO



Be on the cutting edge. If you are looking for a great handling, superb steering mountain bike, look no further than the GT Bravado. It's a high-performance mountain bike that was designed, and has the capability, to be another first.



Moving the shifter GT undoubtedly spent a lot of time designing the new shifter. Unlike top-tube shifter, which does make the top tube stronger without the cables. Unfortunately, there's a mass of unwanted cables and guides that tie up the real tube portion, which weakens the tube's performance. We would like to see GT try a few, please your customer's bike to help save some weight.

Each observation, a 23 tooth top tube, 1.175 inch tall bottom bracket, and a five-tooth track arm. Double-topped seat stays that are extruded rather than tubular. Both weight saving routes that also increase frame strength.

For the asking price of \$999 \$1109 with the Rock Shox option the Bravado features an interesting mix of high end components and more budget accessories. Milwaukee Dealer: KT Sports Inc. Plus

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For a Zoom dealer near you, or if you're interested in carrying Zoom components in your shop order to: GT Design USA, 4225 Midway Ave., Santa Fe Springs, CA 90670, or call us at 213 496 3925.

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DELTA

GT BRAVADO

delivers and looks GT streamlined take on the shifting chain with their road, rear Bravado efficiency. When you're comfortable about having others to figure out last year's Rapidfly chain with both from having to be pushed forward, the new setup that has one fixed forward with the thumb (spindle) and the other pushed forward with the forefinger (brake/shift), is easy to figure out within the first few days of pedaling.

Making up the books, tools and work assembly are lower cost Shimano (Dura Ace) components. Grouping mixing in all the top this year with many companies relying on the concept of using the most important upper and middle and lower end "everything else" to make the bike more certain price points and maintain a few more glossy offerings. In the Bravado's case the glossier consists of such items as Dura Ace rear, Panasonic Sanyo tape, alloy handlebars and a cam operated, machined-out, custom clamp. Wheel assemblies are made up of 72 spoke, Araya BM-408 Pro 700c series rim. CF bar clips and straps are mounted to SR7000a profile.

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Though we know that the bike weighed 23 pounds before we headed out to the woods, we were discovered that the

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GT BRAVADO



This shock absorber from Shimano Bravado is one of GT's critical frame components. It can rise to 100-110 mm without the fear of spiking the rear wheel aluminum fork axles on the Bravado. GT's own construction judges Bravado popular due to its own-carbon steel and aluminum solution. Shimano's Bravado 400 suspension fork absorbs shocks during better corner than last year's push-pull design.

weight didn't affect the bike's handling in any adverse way. The Bravado is an excellent handling bicycle. Mavic it's the increasing Yellow Series that leads itself to having such a convincing good time. With a 73-degree head angle and 74-degree seat angle, the bike stays Bravado stable through the tight stuff at top speed. The Shimano drive plays an important role here with the 100 percent reaction they provide. Once double jumps the GT is easy enough to fall in the air.

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DEWE



Co-Editor of
The Sub of
New England



GT BRAVADO

and the front end pushes down significantly to help hold the rear wheel with the leading foot. Then we say "GT the Bravado fork, light and maneuverable. Some riders in the five-hundred to five-hundred (inter) category felt a bit stretched out, especially when reaching for the bar ends on curved climbs. GT comes to you on the other side: the fork is stout and rigid and we were reminded of the weight.

THE BIG QUESTION—WHAT IF?
In the past we have applauded (and still do) GT's determination to stand by their design, because of the sheer force

frames can withstand under the most harshest conditions. Still, we would like to see bikes like the Bravado weigh at least a pound (how about two?) less. Realizing that the most complete frame inspection files are available, can weigh the same or less (see the Trek 990 and Specialized F3 road elsewhere in this issue), the weight of the Bravado (because of the choice of a tubular, a non-suspended, non-revised steel tube) should weigh under 11 pounds (less than 10) with the ground movement towards exchanging forks for those suspension, the Bravado could easily end up weighing over 50 pounds—can you be proud?

Here if GT were to release their single straight frame to the company's signature

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GT BRAVADO

design, we can't help but wonder what weight savings could be had if they used titanium tubing on the Bravado and minimized all the extras. By taking away the 30 adjustable links, going to a down-sweep, non-adjustable dropout, replacing the 10-11-kg stem with a non-adjustable alloy one, taking away the rear wheel adjusting screws, and exchanging the rear 11-kg fork and its accompanying plastic cable guides with a non-adjustable, titanium fork, we can't help but wonder, GT could offer a true bone, lightweight race bike. As it is now stands, the only way to get a lightweight GT is to buy the

Strong titanizer frame, and that's a pricey option. And what if they were to design a lighter, more traditional frame—what then might that bike weigh?

While it's easy to look at 30 pounds and be disappointed, don't forget that part of the weight is coming from the Oros bar ends that GT has been too cheap to throw in, and the handle bars which are as well-known for weight as they are for their excellent traction. GT's approach is one that is hard to look for—the bike gets heavy, but it's because they are trying to provide you with the ultimate mountain bike—a bike that is fully adjustable to accommodate whatever riding style you have, or might have. It's all right here with the GT Bravado.

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TRIALS & TRIBULATIONS OF THE MARKETPLACE

Adventures in bike buying

By Tom Dier

It was many, many years ago. The last bike I owned was a blue road thing that my father finally put together last year. Christmas Eve and my mother wrapped it with a big bow—the one of my older sisters. It was handed down to me in later years when I became proficient at riding a “two-wheeler” and remained my primary mode of transportation, never to be handed down again, as there was no one else to use.

When I was in eighth grade, we moved from suburban Washington, DC, to Paris, France. I remember the planning and packing, but I cannot recall what happened to that bike. Very likely my parents had no intention of bringing the big, heavy, bulky thing across the Atlantic, and it disappeared without much ado. Besides, there was a superb subway system, the Metro—what did I need a bike for?

The next time I even thought of riding a bicycle was early this good year, almost two decades later. I was working on a film and one of the crew members had shipped me the bike in the location. I rode it no more than ten yards down the narrow carpeted hall of the Hyatt Regency and discontinued it usually for only when it was time to take a commercial break and discuss the next day's schedule. Immediately, it rolled it back to his room.

LESSONS OF THE MIND

In my childhood and early adulthood, I was misled by certain things—books, magazines, bad cars. I told no one and simply avoided them as all cases. Sometime in my late 30s, though, I developed a desire to overcome my preposterous fears and decided to try the old demonstration technique. I looked myself on a six-track trek in Nepal and climbed some of the most treacherous peaks in the world. Without

failing. Without fear. The next year, I took a two-week lesson and found that horses are easier and safer and it is exhilarating, not terrifying, now.

When I returned to Los Angeles from location this January, I began to try with the idea of buying a bike. Before I went two-down the carpeted hall of the Hyatt, I hadn't felt that there was a great deal of interest in me, just that I was relatively uninterested in riding again. However, it came to believe that I could get the same exhilaration on a bicycle that I had found on a horse, not only at a fraction of the cost, but also not subject to the whims of some unassuming horse. It turned out to be an intricate process, one that I will never tire to describe, but one which was educational and satisfying.

TWO WHEELS OF REASONING

First, I felt that I needed to understand what I was going to do with my bike so I could get equipment that would serve my needs. After a little bit of research, I was a long time, this wasn't over; I didn't really know what I might do with it. So, trying not to disturb myself, I looked at what I saw and assessed my “horby” and my “spare” behaviors. Was it the type of person who gets horses and rides two or three times all the way? “Trainer? Competitor? Or was I looking for a way to exercise casually? For environmentally sound transportation? I asked myself a thousand times, “Why, why, why do I want a bike? What am I going to do with it? Where will I ride?” With experience, but eventually I came up with some sort of conclusion: wherever they fell right—exercise, transportation, a little bit of danger. It was a huge help when it came to making the final decision.

If you haven't ridden a bike for a long

time, one of the biggest things to assess is where you are going to ride. Consider this: If you ride to the corner market for a quart of milk once a week, your needs are quite different from someone who commutes to work daily from Hollywood to Santa Monica, and different still from the person who wants to ride the roads in the local mountains. A road trier, among other things, a bike that's light. However, for someone like me, the difference between a bike weighing 27 pounds and one weighing 29 was inconsequential (at this point). There are millions of bikes out there: bikes designed for touring, road travel, recreation, fitness, mountainous terrain, and racing. They range in price from a couple of hundred dollars to a few thousand. It's essential to know what you need before you purchase what you want.

WHAT IS A GOOD BIKE?

My second step was to talk to other people who ride. The first guy I asked told me I could get a good mountain bike for under \$300. I told someone else that I thought I could try a good bike for under \$200 and he laughed in my face. They obviously had different ideas of what a “good” bike is, but the information I got from each was helpful.

I asked these questions: Where do they ride? Are there trails near where they live? What about your own home? Do they drive somewhere to ride? Do they ride on the street? Where do they ride? They might “know” where to ride.

Additionally, recognizing that I didn't know anyone who rode a bike, I called bike shops and asked the same questions. (You can also find people often listed through bike clubs, which are often listed in related magazines, such as *Bike*, *Two WHEELS*, *Local Papers* and *Environmental Club* sections.)





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Next, I set a price range. With little bike knowledge, I set a range that was about what I wanted to spend. This was purely an economic decision, wholly unrelated to bikes. (I think you're a big spender right off the bat, you'd realize it. I know I could spend more if I wanted to, but I didn't want to...)

DO YOUR HOMEWORK.

Then the indispensable phase: research. I read everything I could find. I got old Consumer Reports and fishing magazines from the library and bought new issues (think kindle) as well as financial magazines to see what bikes have sold well and why.

I spoke to the AAA and the Sierra Club, both groups that offer bike tours, and two other biking tour companies. I

looked into information on other rates in other countries, why and where.

When I felt I had good preliminary information, I made a list of the features for each bike I was looking for in a bike and considered their importance to me. My list contained the following information, readily obtained for any bike price, components, wheel position, stem, handlebars, weight, frame and fork construction, chain length, top tube length, geometry and color.

Some of these terms were foreign to me, like "fork," but as I understood more about bikes, I understood more about forks. That led me to learn about frame building techniques, some of which I'll never have to know about again, but which did help me realize how bikes are made and how some are made better than others. Other things, like the geometry of the frame (like angles between the tubes of the

frame), were interesting (because I like math), but that's about it. Of all the bikes I read, three out of four had angles of 71.7°. Of the top ten frames, none had those angles. That was good enough for me, especially since I couldn't tell the difference while riding between 71.7° and, for example, 71.72. Proving that it wasn't high on my priority list, I eventually purchased the old man's.

LET THE SHOPPING BEGIN

I looked up bike shops in and out of my immediate area and visited every one. Talking with proprietors that far (they were all men) was the first take-along I'd visited, I looked to what he had to say. It

MARKETPLACE

every subsequent shop, I became more familiar with bike anatomy and physiology (gears and functions).

Each salesman heard me say, "I'm thinking about buying a bike, and I'd like to go off-road, so maybe a mountain bike..." When the salesman would say you're committing, I'd ask why. When he didn't show me something, I asked why not. I write down every answer and found out if the shop offered some kind of service worth any. Then I felt—without riding a single bike.

I took all of my data home and compiled it on paper, with my original ideal list. Five bikes were in my price range and had the components I wanted. I compromised on price and components and made one priority list. For example, the difference in six ounces of weight was not as important for me at this stage of my riding career. However, good components were important, though I was not quite ready to pay for top-of-the-line shafts and levers. The bottom line for me was that a good bike was better than a cheap bike, so I was most flexible in price.

STILL NO PURCHASE?

Comfort is critical but it's not something you can determine on paper. I went back to each of those shops and rode the three suggested bikes, then three others.



The others were'n necessarily ones I was considering, but I knew it was important to see that all bikes feel different. As time I couldn't tell, but after enough riding, I noticed that some bikes were comfortable for me and some weren't. I should probably say, my bike that I felt was being pedaled on me, something I tend to do with any product.

Assisted by both answers, I pushed until I got full responses. I just kept asking questions. For example, one salesman showed a "rugged mountain bike" as I asked where the big deal was. I began to see that, in a few shops, I was being treated like some stupid kid. Hey, I'm no Thomas or Linton, but I don't want my salesman being obnoxious or condescending with me.

I asked one shop owner why the dealer's wife is like I'd seen and liked elsewhere. He stated naturally for 20 minutes about how busy it was but never said how or who, and finally stated his cat's paw will fight out of his business. Maybe he told it for me because he could get any attention or my money or business. He didn't.

I went home and listed my rules again.

All of different groups for a different price. Components provide any compromise in price, weight and performance. Unfortunately, the lightest, strongest and most trouble-free components are also the ones that cost the most money.

You wouldn't put on three pairs of socks to make your shoes fit, so why would you put a load of pads in your helmet?

Nobody with size 9 feet will buy size 12 shoes and wear extra socks to make them fit. Yet many cyclists are forced to wear an oversized helmet stuffed with thick foam pads trying to make it fit. Where's the logic?

Listen, most fit helmets just

don't work as well as fractionally sized helmets. Helmets made in 2 or 3 sizes rely on soft, oversized "foam pads" which will compress on impact and localize the forces to the narrowest contact points, leaving the helmet loose on the head.

Serious impact can even knock poor fitting helmets off the head. Headway's Anatomical leading bicycle helmet manufacturer, and we've been in the head protection industry for over 25 years. The award-winning Headway 700 is built in 9 fractional sizes, with a

internal shape that reflects intensive research and is sculpted for a perfect fit and uniform shock absorption.

Headway 700 helmets are Snell E90 approved and feature our exclusive Titanium ArmorPlate™ coating to

unique and effective it's in a category all its own. They also feature the sleekest, strongest "punch free" quick release buckle ever.

Don't compromise your fit—see your dealer today, or call (800) 251-0775 for a brochure.



HEADWAY.
FIT TO BE TRIED



Time for them? There's a science to finding the right size bike, too. (Continued) Finding the best bike components that share the same bearing standards are key. They should give a bike that gives you about 2" of clearance when you straddle the frame. For other important measurements to make for a fit you get the proper leg extension and seat tube at least 2" of your inseam in the frame.

my primary time and then re-evaluated. This was the biggest one of the pack again. (The rule just isn't enough to determine comfort.) You had different on different days and I wanted to be sure that I was getting a bike that would be comfortable for me. (I also asked the same question—and never failed, what if I got a fit that's not—I had on my first week. Why is a good, mechanical good? There is really none?) How do you check a bike? What's the difference between these two and these?

FINAL RETURN

I went back to the store with the top components and made the rest of the pack again. (The rule just isn't enough to determine comfort.) You had different on different days and I wanted to be sure that I was getting a bike that would be comfortable for me. (I also asked the same question—and never failed, what if I got a fit that's not—I had on my first week. Why is a good, mechanical good? There is really none?) How do you check a bike? What's the difference between these two and these?

I can't believe good research enough. If you go to a shop where, as I said, they may have some of the best bikes, and you

find you as a shop and try to sell you a cheap, basic bike. (After a few times I found a salesman try to sell a \$200 bike—to me and to others—because it was obvious the person had no concept other than price.) If you are going to make your purchase on your own, then take your time, but go to a department store and get a really nice with a basket and a bell.

Really, I felt tremendous when the mechanic had showed me the bike I finally bought (which is a custom)—they will check out the tires, shifters, levers, etc.) I said to me, "This is a good bike you bought. You'll be happy. It's a really good bike."

I made an excellent informed decision and bought a bike which I will never and will never. This was about six months ago, and yet I'm surprised now and there to discover there are things that I didn't find out about of my continued research.

FINAL TIP

You can adjust your seat height. I would have thought it should be, that my leg should be almost fully extended, but my knee shouldn't be locked at the bottom of the pedaling downstroke. I felt knowledgeable but, even so, my seat was still too low, despite the fact that the manager of the shop where I bought my bike saw

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Shifter about. Suspension is considered for the standard design. And this time around, the standard design component adds weight to a bike and dollars to a price tag. Suspension forks typically cost between \$100-\$200. Consequently, they're almost the only other major component that's added to the frame that isn't.

we ride a three times and never measured the average flexion in the leg.

If you have a shifter a little to a long time (say, 20 years), it's a hard thing to gear yourself. The bike you ride in '90 is not like the one you ride in '90, especially when you want to sit on the seat and put your feet on the ground. You can't, just make sure you can stand over the top tube with a few inches clearance (it's not much, it's not nothing to do with the seat). In any case, a third speed or two and a shifter is for me. (Speaking of which, if your seat is adjusted, make sure your seat reflector is in a place where it can still be seen.)

The same thing will see my seat also moves from to back. On rides of ten or more miles, it sometimes get a sharp pain above my left shoulder. (This third seat I was too stretched out. "Why don't you move your seat forward?" he asked.)

I was shocked. "I was never in forward?" Of course, I was also thrilled. "Someone else instinctively taught me another very important lesson. If you have quick-release wheels, they must be removed when you put them back on. I know it sounds simple. (I'm not why didn't any of the salesman tell me?) If they aren't installed, not only can they make noise while you are riding them over the rubbing against the frame, but your braking effectiveness will be reduced because the brake will be too close to the rim and you



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When it comes to KHS, you won't find any pre-made modifications on the KHS team. Instead, we've got racers like "Irene" Weyer* (Crested), a National Champion two years in a row. His input keeps our bikes so light and fast he just flies over the toughest race courses in the world.

KHS (Klein Hill Design) spacing on the KHS 1992 line-up features radical technical advancements.

True Tempur's high strength, heat treated, leatherweight CX Ultra II and JWS off road tube sets give KHS frames incredibly responsive handling. State of the art components include Weinmann Boatracer BC8 rims, Panasonic Smoke Kauler tires, Shimano control-frame bottom brackets and Shimano transaxial axles.

KHS's new line of stems, handlebars and seatposts boast unbelievable strength-to-weight ratios. Watson's finest new X31 components with Ripoffite Plus spec out the top of the line. Watson's Team of just 23.8 lbs. The 1992 Mountain Pro F2 with full X31 and Rock Shox Mag 20 suspension fork is an absolute 25.9 lbs.

Take a lesson from the pros, and see the new KHS mountain bikes. Go for a test ride, and vote for yourself the lightest, fastest bicycle in 1992.

For our free brochure or a dealer near you call 1-800-851-4475.



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KHS

MARKETPLACE

will be no tie. Frontier printing is the winner. It gets extra.

View: Don't shoulder's fall off, but because it happened to me, ask the shop to show you how to get it back on. They will show you two ways, but insist it's easy and could save you some trouble. Mine fell off at the end of a long ride when I was very slow (thankfully) to home. I don't always return users to the bike store to say, "Hey, what's the deal?" and they showed me how to get the chain back on. Simple — see it sometime when passing.

They will tell you to keep your bike clean. You ask how. They say with a yay and they have 1000 special cleaners. Or bring in a little lady, and we'll clean it for ya. They won't say there's a charge for that, but there is. A.H. Nothing is free.

Or better yet, wipe your own dirt off your own bike with a well-oiled when you finish your ride.

OPENING UP A CHARGE ACCOUNT

Of the three accessories that seem to be the most new bikes first buy—padded pants, gloves and helmets—only helmets are indispensable. They reduce the risk of head injury by 88 percent, which is a lot. You only get one head, so use it and spend \$60 on a helmet instead of

1000.000 to more like a lifetime of even better ones — four (highlighting that one one shop even offered me the use of a helmet during my numerous test rides. Only the store where I finally made a purchase asked to return my old helmet was one of 1 placed on my head when the price of the helmet, however, everything I had needed a helmet in a store for any type or length of ride, which I believe.

Painted pants really do help. It's very easy to buy something called "bike shorts" (happily cut off at mid-thigh, which now I measure the number of you size as of all but will look really cool if you want to be like Madonna. However, real bike shorts aren't just for looks; they are for comfort. So, if you need that padding, go to a bike shop and get the real thing.

The same thing with gloves. Although weightlifting gloves will work to protect your palms, the distinctive shape on the back of the bike glove (leaving or instead to wipe off sweat is a blessing.

Didn't I say nothing is free? Kudos to my accessories. If you want one, you have to buy one.

There are two popular lock: cable locks (usually with a combination) and combination locks (usually with a key). I have a cable lock, because with quick-release wheels I wanted to ensure that I could lock them to the frame and then lock the whole bike in whatever was handy. It's your choice, with the caveat of



warning: Cable locks can be wrapped in some type of heavy vinyl and coated at the factory. They can be very difficult to stretch to their six-foot length and therefore may not get through bike stands, the frame and your walk or your vehicle's lot of wrapping and wrangling. Keep it in mind.

I have a friend who makes fun of me for using a black water bottle in winter; my bike, he thinks my water will get warm with the sun heating down on a black bottle. He's right, but I don't care. I don't like cold water when I'm working out... but if you do like your water cold, take heed.

Last of all, I didn't think a car lock was necessary until I found that I wanted to ride in places other than my "back" like the beach and mountains. There's so much a cage in car locks to them in other accessories, and I got one that snaps to the rear of my car. I thought it would be easier than lifting my bike on and off the top of my car (myself) and changing tires. I'm very happy with it, although my car needs two more my size. That's okay, I don't own one. The idea of using car locks?

Looking for Mr. Oxydromed? You will find more than one of the same size. Please find a shop with a friendly and well-stocked repair staff that has the right tools and training to handle any problems that might develop with your bike.



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GT TECH

TWENTY

some years ago, someone, somewhere, was inspired enough by the experience of putting fat tires on a bicycle and flying down a local mountain to coin the term "mountain bike".

In 1983, high technology has moved into the world of mountain biking and it's no longer as simple as it used to be. Materials include not just steel, but aluminum, titanium, carbon fiber, kevlar, and fiber. Bikes have 24 speeds, cassette rear derailleurs, and shock absorbers.

Through this recent evolution of mountain biking, GT has been not only a contributor, but a leader. The Triple Triangle Design frame, shown in various sizes, and reinforced head tube covers are just a few innovations pioneered by GT. For 1989, GT again breaks new ground with frame features like our new Groove Tube replacement rear derailleur hanger and vertical dropout reinforcement.

New seatposts and quick release mounts are just a few of the exciting innovations GT has produced for you ahead of the curve, while keeping your choices clear.

Getting a good mountain bike may no longer be as simple as buying a set of fat tires, but picking your equipment should be. GT Tech Shop makes it easy.



Groove Tube

It's not for anyone without a car. A 1.1 liter in 1989 was the first time a 1.1 liter engine was used in a bicycle. The engine is placed in the top tube, which allows the rider to feel it when they are riding. The engine is placed in the top tube, which allows the rider to feel it when they are riding. The engine is placed in the top tube, which allows the rider to feel it when they are riding.



PSYCLONE

PSYCLONE is a new frame design, designed by Triple Triangle Design. It's a new frame design, designed by Triple Triangle Design. It's a new frame design, designed by Triple Triangle Design. It's a new frame design, designed by Triple Triangle Design. It's a new frame design, designed by Triple Triangle Design. It's a new frame design, designed by Triple Triangle Design.

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17200G LC

Middleweight road bike with low weight and a frame weight of only 2 lbs. 4 oz. 17.2's, riding gear complete for the racing 17.

With strength, low weight and a frame weight of only 2 lbs. 4 oz. 17.2's, riding gear complete for the racing 17.



TECH SHOP

ZASKAR AL

Manufactured in OT headquarters in Huntington Beach, California, the Zaskar AL is the epitome of strength and beauty.

The Zaskar AL's Triple Triangle Design is constructed from lightweight 6061-T3 heat-treated aluminum, incorporating over 1000 unique tube profiles and joints forming a total tube geometry that Zaskar AL is as tough as it looks.

Further, their covering it with an anodized clear finish. A mid-range "Real Bouncing" feel from its "Real geometry," built from aluminum increases the strength of aluminum and gives the frame a work-hardened texture. The exceptional choice of both materials combined to produce 200% longer than traditional head pointing.

Built in proper Team OT's Pro speed standards, the Zaskar AL is the same like others by Team OT and Jimmy Logo.



It is a fact that while some pro cyclists may be riding bikes with the bike sponsor's logo, their frames are often built by someone else. Not OT. All frames shown in this brochure are the same frames ridden by Team OT, and are the same frames available to you.

Model	Frame	Headset	Seatpost	Stems	Handlebars	Spacers	Wheels
ZASKAR AL	6061-T3 ALUMINUM	1 1/8" x 28mm	31.8mm	31.8mm	31.8mm	31.8mm	28" x 23mm
ZASKAR AL	6061-T3 ALUMINUM	1 1/8" x 28mm	31.8mm	31.8mm	31.8mm	31.8mm	28" x 23mm
ZASKAR AL	6061-T3 ALUMINUM	1 1/8" x 28mm	31.8mm	31.8mm	31.8mm	31.8mm	28" x 23mm

INNOVATION





MADE IN U.S.A.

Our dedication to perfection doesn't end with frames. GT Tech Shop components are engineered to perform under the most extreme conditions and designed to lasty into the most demanding situations.

- 1 GT FUP ROP can attach two different riding positions, and can be changed in seconds. Constructed with a heat-treated aluminum extension and aluminum gull, the lightweight Flip Top stem is available in 90mm, 100mm, 110mm and 120mm lengths.
- 2 Made in the U.S.A., the GT precision-machined SEAT POST CLAMP is available in two sizes to fit 1 1/8" and 1-1/4" stems.
- 3 7" one-piece aluminum. GT's precision-machined 30° ALUMINUM CRANKS are light, strong and constructed from a single piece of aluminum alloy. Made in the U.S.A., these cranks feature a removable pedal-to-axle spider and are hand-polished to a mirror finish.
- 4 GT's uniquely machined QUICK RELEASES feature stainless steels and aluminum 30° levers. Made in the U.S.A.
- 5 GT's precision-machined TYE ARM and BOTTOM BRACKET actually reduce weight in the critical area. Complete with aluminum cups and 3/8" precision-machined bearings, this high-performance titanium bottom bracket is completely adjustable for perfect alignment. Made in the U.S.A.
- 6 GT HORIZONTAL features heat-treated aluminum alloy, 5" fixed and 180mm length.
- 7 Made in the U.S.A., GT's tubular TYE ARM CRANKS are precision-machined from 303 stainless. Strong, rigid and strong in strength in single or double over-lead. One crank offers optimum power transfer into rotation.
- 8 GT's 30° POST features 3/8" wide polished levers and computer-designed aluminum rear supports with three different fork positions. The 20 fork's mounts are spaced 7 inches apart and allow the rider to adjust the handling or "feel" of the bike for varying terrain or riding.



BIKES FOR BIKERS WHAT YOU GET FOR HOW MUCH

By Ed McClelland and Mike Katz

One of the greatest surprises to mountain bike shoppers is how much money has come out of our heads accounts to put a new mountain bike in the garage. Here are some of those bikes and as much as \$4000 which offers that look familiar to the average \$2000 or Charles Keating insured mountain bike business owner? What's the deal?

FRAME TYPES & WHAT THEY COST

For starters, it's important to learn how much difference there can be in frames and frame prices. The latest expensive frames are made of low-grade steel. They're typically either heavy and bulky, strong or moderately heavy and not all that strong, and generally they offer low-quality workmanship. This is what you will probably find on those mass bikes made to look like the expensive bikes and selling for \$1000-\$2000.

The next grade up in frame construction is high-tensile steel, which is stronger than the mass bike steel but not as strong as chromoly, the next grade of steel tubing. You will probably find high-tensile steel tubing on mountain bikes selling for around \$300.

The next grade up in frame tubing is standard chromoly (an alloy of steel that includes chromium and nickel) which means it is uncoated. You will probably find this kind of tubing on bikes selling for \$500 to \$600 or more, depending on the components. Heat-treating the frame after it's welded together is another factor that will add strength to a bike by allowing atoms to re-align—and raise the price some more.

Moving to another grade of frame material gives you a choice between aluminum tubing and double-butted chromoly tubing. Both can offer greater lightness or strength than regular chromoly tubing. A double-butted tube offers distinct walls near the ends of the tube where the stress is greatest, and the inner walls towards the middle of the tubes (where stress is low). A well-designed, double-butted tube will be lighter than a standard chromoly tube of the same weight. You may find double-butted chromoly tubing on bikes selling for as low as \$800, but the manufacturer will have to draw out somewhere else to make that price point. Aluminum-framed bikes usually sell at a price starting at \$150, with the choice of components determining the final selling

Bikes made with "exotic" materials (especially fiber frames, carbon fiber or composite frames) usually retail and can-

be in three combinations. Titanium frames generally start at around \$1500, carbon fiber frames start at around \$1800, while composite frames (not steel) start at around \$300 for chromoly or aluminum combined with carbon fiber (with prices rising as the amount of carbon fiber increases), and go all the way up to \$2000 for a frame like the one John Thomas uses, which features carbon fiber tubes and titanium legs. (Thomas' bike would probably retail for somewhere over \$4000.)

COMPONENT PACKAGES

"You get what you pay for" is one of the most frequently quoted expressions in the bike business. It's also a good predictor of the quality of components you'll get on your bike.

Shimano's top-of-the-line components are their XTR group. This is what you'll find on Tom's and Rudi's current sets on their bikes. The XTR parts are the state of the art in mountain biking, but they cost a bundle.

To buy a complete XTR group in your local bike shop, expect to pay somewhere close to \$1800 (the suggested retail price) and that's before a particular retailer adds six, eight, or ten percent. From your choice, front derailleurs, chain, rear gear cluster, rear derailleurs, shifters, brake levers, cassette, cables for brakes and shifters, front and rear brake, seatpost, quick-release for the hubs and cassette, and a headset, items not included in the standard component group are rims, spokes, tires, inner tubes, nuts, handlebars, grips and saddle.

While it might be possible for a consumer to buy the XTR component group for as little as \$1100 from a high-volume discounter, a manufacturer like Specialized or Nishiki might be able to induce them to price enough volume wholesale to negotiate a price as low as \$700 or \$800, a lot, but then you'd be stuck with it. It's not easy to get the XTR equipped bikes set up for someone else as little as \$1800 retail. In any case, it's likely that buying a new XTR bike and outfitting your old bike may be a better deal than upgrading your current bike with the new component group. Campagnolo's "Vintage" line of 11-speed components is priced at about the same level as the Shimano XTR, and will also be found on bikes at this price level.

The next-level Shimano components come in their Devo X10 group, which costs less than Shimano's XTR. It's generally found only on Shimano mountain bikes selling for \$1200 to \$2000 price range. Still an XC (cross-country) or priced competitively and will also appear in the price range.

Shimano's SX and SanTour XC Component lines are the next price level of parts, retailing for around \$450 to \$500. In the winding-over's opinion, these component groups are probably the best

expensive ones capable of dependably standing up to expert or professional levels of competition. They are most likely to be found on new bikes priced between \$800 and \$1500.

Shimano's Devo X1 and SanTour's X1 component groups retail for roughly \$500 to \$600 and will generally be found on more bikes priced between \$300 and \$600.

Shimano and SanTour both offer several grades of even less expensive components than the more traditional others. These, which include sub-designations as SanTour X1, Devo X1, Devo X10, Devo X10, and 180 X1 on the Shimano side, and SE-LT1, SC-T, SC-F on the SanTour side, are groups you'll most likely find on bikes priced from \$200 to \$400.

Is there a noticeable difference in feel and performance from one group to another? Yes. Does the weight of the components go up as the price goes down? No. Are the more expensive components likely to stand up to harder riding with fewer problems? Yes, again. These are the very reasons why knowledgeable riders pay so much more when they compare they and on their bikes. Does the working over have a favorite component group? Absolutely! The Shimano XTR stuff is the best we've seen or ridden to date.

OTHER FACTORS

One of the more places to cut costs on a bike is in the wheels. Good alloy rims, good alloy tires, double-butted stainless steel spokes, alloy nipples and lightly-laced wheels make a big difference in bike quality, a much greater difference than you will experience by giving up a component group. If a bike has better components, but most in its price range, make sure the manufacturer didn't skimp on the wheels. An absolutely top-quality pair of wheels (custom-built by a good bike shop can cost as much as \$300—buying off the shelf for XTR bikes, \$210 for Mavic ceramic rims, \$65 for spokes and nipples, \$20 for tires, \$20 for tubes, \$25 to \$40 labor for building up each wheel and \$60 for a pair of single-spoke axles, etc.). A pair of cheap wheels on a \$200 bike might cost the manufacturer around \$15. You would notice the difference, believe us.

If you want to get best suspension on your bike, expect to pay an extra \$200 to \$250. The amount will depend on the price of the mountain bike you are buying (usually \$200 to \$4000), and the price of the regular bike you are now getting (typically \$20 to \$200). Rear suspension on a bike will typically add another \$200 to \$300 to a bike's list price.

A generous helping of stainless-steel parts like the crown, seat stays, and seatpost can save weight and lighten your bike in the process. It just depends on how much you are willing to spend. ■



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THE BUYING HAS JUST BEGUN THE WELL-ADDRESSED MOUNTAIN BIKE

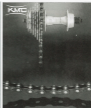
BY THE MOUNTAIN BIKE ASSOCIATION

Now that you have a new mountain bike, it's important to get used to the proper equipment. Though your day-to-day use might be for the job in general, the specially designed cycling gear makes a big difference when it comes time to spend extra time in the saddle. The following items are just the basics, but they are important items.

1. No matter how safe you want to be on your bike, always use your gear to fall off, and when you crash there's no single more crucial piece of safety equipment to be wearing than a helmet. Besides cost and appearance, the things you will want to look for in a new helmet are ventilation, comfort and fit. If the helmet you're looking at doesn't have either a BASKET, AIRFLOW or DRYTHERM, you're in the next one. You can expect to pay somewhere between \$30 and \$90 for a helmet, with the expensive ones not necessarily being any better than the less expensive models. The new extended helmets have made the formerly plastic-covered helmets obsolete, but both are better than the "hard" helmets replaced by either.



Choosing, choosing! With all the different companies, models, frame materials, component groups, frame sizes, suspension systems and frames available, it can be tough to decide on just one bike. Choosing a good one is a good first step.



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Shock It	\$199.99	1.8 lbs.	Adjustable adjusting spring
Shock It	\$199.99	1.8 lbs.	Adjustable adjusting spring
Shock It	\$199.99	1.8 lbs.	Adjustable adjusting spring
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2. When pedaling along at 23 mph it's hard enough just feeling the wind and it's in your eyes. In about a mass of legs and bunched pedals you get a good pair of protruding eyebrows that you get a squinted vision of the handlebars or back always in your face. Though the wind is effective breeze are the most popular, the winding cow wears by close losses to guarantee the best handlebar by types of riding.

3. Like we said before, buy a bike and you are going to crash. However, the prospect of falling off isn't so bad as long as you have the proper safety apparel. Gloves are often overlooked, but they do a great job of protecting your palms when you feel the ground. It's not always the only thing better than a water bottle full of fluids in a pair of gloves with tear-resistant straps on the back to wrap off your wrists from.

4. There are few things we enjoy more than leaving a new bike's rear (probably position that will never be single lead in a pair of side-clip 1.5mm shoes. Of course, the real enjoyment comes when you can't walk straight for three days after putting in an afternoon ride wearing Levi's denim. I though cycling shoes may cause the most accidents of some kind and increase the fatigue consequences of some riders. But as for things to cycling that make us crash, none. The big advantage is the use of a chainless driv-

ing to the crutch and seat area to prevent chafing of the legs. Fisher trailers as a lighter equivalent is typically used for pushing and it makes the difference between coasting from mountain to seat plate pedal! The pedals are in a ball, some shoes also offer padding around the hips, a worthwhile feature. Expect to spend anywhere from \$20 to \$40 for a pair of shoes. There are some a variety of heavy shoes available that have the same built-in shock padding for those people with joint problems.

5. Cycling shoes are the least important riding items for fans, although they can also make your cycling experience more enjoyable. Real cycling shoes are most helpful because they have either one or three pockets sewn onto the back, where you can cram extra food or junk. Some shoes are made of a material called Gore-tex, which can "lock" the perspiration from your body to keep you drier and more comfortable. Prices can range anywhere from \$150 to \$200.

6. You could ride with standard racing shoes, but cycling shoes do offer advantages. One of the main ones are a stiffer sole to provide greater comfort when pedaling and a narrower design to make getting in and out of the toe-clip system efficient. A clip-in pedal system is best left to expert-level riders, who are less likely to fall over when trying to free their feet in technical sections of trails. ▶

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not only that, our new, contoured quick release buckle with latching, accidental release and eliminates chest pinching. **WE FIT YOU PERFECTLY.** Because that's how a helmet should fit. The thick foam padding used by the "multi-fit" is a symphonic fit to your head, and a helmet is a head!

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Not only that, our new, contoured quick release buckle with latching, accidental release and eliminates chest pinching. **WE FIT YOU PERFECTLY.** Because that's how a helmet should fit. The thick foam padding used by the "multi-fit" is a symphonic fit to your head, and a helmet is a head!

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**NECESSARY ACCESSORIES
HANDY THINGS TO HAVE
ON BOARD**

By Mark Conner, *Mark Conner Cycles*

Once you've got a bike, there are some other things you will want to take with you on the trails. If you can purchase your favorite tools from your local bike shop or order them with a fully loaded bicycle, that will be a big plus. If not, plan on bringing these items along:

1. Two spare front fenders mounted to your frame, with two large capacity fender flaps.

2. An under-seat tool bag with the flat tire levers and assorted tools (Allen wrenches, spoke wrench, chain breaker and screwdriver). Our favorite tool is the Good Tool, which has all the aforementioned items in one bag on our tool.

3. A tire pump or CO₂ cartridges for road bikes. Road tires are often made in your size. It's a good idea to bring along a Kona-style adapter as well, in case you run your Pirelli tube and need up to blowing a 2.6 or other tube brand.

4. A ball for your handlebar. It's one of the most sensitive ways to trim the bars and tubes of your approach.

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M STANDS FOR MOM... & MOUNTAIN BIKING

Darcy Dangremond's chores as a mother include getting dirty for a living

There is no more telling someone to do it than to see them do it. Darcy Dangremond is often in her element when we asked her what her biggest joys are in life. She laughed, then paused, then asked to come back to the question. When we did come back to it, she laughed and passed some more. Really willing to do the simple stuff's kind of cool. Imagine me being able to do that of a single grip in the whole world? And most people that question you will have interest before they're halfway through their life!

For the last few years the reserved Dangremond has been showing up at SOBHA Nationals and simply telling her life's hardy tales to the live talking. Lacking the formal presence, both on and off the track, of others like Julie Parake and Sara Matthews, Darcy's sense has not been without good results. At times, though, she has had one thing going for her that no other top-tier female SOBHA pro can claim: a six-year-old son was cheering her on from the sidelines. In fact, Darcy is the only mother in the park with such consistent high finishes. "It doesn't matter, she is also one of the fastest and smartest kids I know."

We decided it was time to have a chat with the Pennsylvania native to find out what it's like doing double duty as a mom and mountain bike rider. What we spoke to Darcy also was in the middle of getting together another program for the '92 National Series. The plans on returning to the Pro class along with her sponsor from last year, Fuji City Cycle.

FROM MATT

TO MOUNTAIN BIKES

What's first of all, then she did you get your start in mountain bike racing?

Working more. For the father Darcy Dangremond grows one after year that you can be a parent and still have fun that's a thing racing mountain bike. Her son that is already riding mountain bikes and enjoying the great outdoors of the nation's most bike should be so happy!



Darcy I started riding mountain bikes to get back in shape after my son. Matt was born six years ago. I found out about a local race which I decided to enter. I figured I would sign up for the Expert class because I had. The longer distance they had to go—I really enjoyed it. '88 I continued to race locally and I was everything after that. In '90 Catechista sponsored me for the WORCA National Series, where I ended up fourth overall, plus I finished second at the Mountain State Series in '91.

MMA: How hard was it getting used to the four-hour?

Darcy: It was a problem for the first couple of years. I just wanted to get experience at what the bike would do in certain situations and what to expect. I had a couple of trail buddies that rode on the public, but I've learned to live with it, so it all becomes more second nature.

MMA: Do you race full-time?

Darcy: In '89 and '90 I raced and worked full-time as a financial administrator. I had to take my work out on the road with me! Last year was the first time

that racing became my primary concern and I did it's work. I was right financially, but the money I made racing got me by.

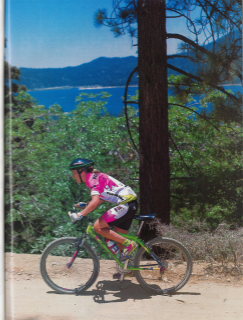
MMA: What's your training schedule like as a full-time mother?

Darcy: It's gotten a lot easier now that Matt is in school and sees his own activities. It gives me the time to train properly and do what I have to do. I also have help from friends who will watch him when I can't.

MMA: What does Matt think about seeing his mother's hobby?

Darcy: He really enjoys the track. I think it's a good experience for him. Everyone is receptive to him and the outdoor atmosphere and sometimes provide a good environment. He has a good understanding of the racing world and I get him his own mountain bike that he

WORKING THE WOODSHEET SHIRT: Darcy Dangremond has more than training to take care of during the event during her busy day who has a six-year-old son making the day of home. The Pennsylvania native has been married to the National Team for five and two years. ■



MOM...

rides on the walls. He tells people that I'm a mountain biker, even and his teacher at school wants me to come in and talk to the class about what I do.

MM4: What's the atmosphere like in the house's "fit class"?

Davey: It's a nice mix. We'll go out long, really cool off the car track, but on the week of a triathlon, that's when we're there for I like the balance of the friendship and competitiveness, and I'm appreciative of all the help they give me when I start on...

MM4: What are your feelings about how women are viewed in cycling?

Davey: I'd definitely like to see more women racing, but the money's just not there like it is for the men. We're also working hard and trying to make a living at it, and the women's fleet can be just as exciting as the men's. It gives that one physical capabilities are less. I mean we can go the same length—it will just take a little longer. There's no denying that there's a difference between the men and women, but it's not that the women are trying our best.

MM4: Is there a message you'd like to give other women who might be thinking about taking up racing?

arms fold down when not in use, and the entire unit can be cranked on or off in seconds.

All of which means the perfect place to carry bikes out back is the back of your sport utility vehicle. Because, contrary to popular belief, there's not always a flat area just at the top.



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They try they have to learn to go out to do it and have fun at first...forget the racing. The consistency is one of the best things about racing. At least that they will often have more and women in that same race, and I've found that they enjoy women racing alongside them. Don't forget that you might also surprise yourself and do well!

VITAL STATS

NAME: Darcy DeAngelis
WEIGHT: "I don't have one."
BIRTHDAY/PLACE: 3/12/68/Waterloo, New York
COMPETES: Pentsting, Pentsting.

SPONSOR: Pan City Cycles, GO-SPOONER, Single Components, First Trips, Ladies Unlimited, Oakley
BIKES/TEAM: First Chance "No-Billy Team/Year Sponsor GR Shim, BRADYBROS, Campagnolo Theodor Minsky Equipment.

ADDITIONAL COMMENTS: Profile Changes have, Single components, one change and bottle caps. Always clean, OK at age.

BIKES: "Yikes."
PERSONAL TRANSPORTATION: "A '91 Sub-Zero. It's a nice car and I don't get it from racing bikes."

LIFE/LEISURE ACTIVITIES: "I'm pretty recreation oriented. I like rollerblading and running and recently I've been getting involved with my son and he activities like soccer and hockey."

FAVORITE FOODS: "Fats and vegetables. I feel good when I eat them."

FAVORITE MUSIC/ACTS: "I like all kinds. But I'd say Phil Collins and Bruce Winwood are my staples."

FAVORITE MOVIE: "Yikes. It was a very interesting story and it made me think about things in a different light."
FAVORITE ADVENTURE/ACT: "Mountaintop Mountain. It's so different for me since I'm used to riding on the flat Coast."

FAVORITE ADVENTURE/ACT: "I guess I'd have to say Big Bear because I've always done so well there."

MM4: "No one in particular. I advise people who are racing their first or what they're trying to do. It helps make the world a better place."

MM4: "Happy people with good attitudes, being outside and fun and Jerry's Cherry Garcia ice cream."

MM4: "I'm having trouble with that one, nothing comes to mind."

MM4: "Trying to do the best I can do...contributing to my life."

COMPETITION RECORD: 1993—fourth, overall NORBA National Series (also, Big Bear, CA, NORBA National Series); fourth, Norba, Park City, U.S. NORBA National Series; 1994—fourth, Big Bear, VT, NORBA National Series; first, Mt. Snow, VT, NORBA National Series.

LAST THOUGHTS: "Hold your bike and have fun."

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NEW KID ON THE BLOCK

From the mouths of babes comes feel-free philosophy

In a day and age when it seems that our youthful generation is generally up to its eyeballs in the latest fads, it's like the Nordic folk come along to remind us that they aren't all dead. The premiere 15-year-old from Boulder, Colorado, is a shining example of not only how enjoyable life can be, but also of the positive influence he can have on youngsters.

The winning crew first took notice of Nicole at the NORBA Nationals where she rode her '93 mountain bike with 24-inch wheels. It was quite a sight to see her show off the starting line with the rest of the Junior Women racers on a bike inches lower than everyone else's. Even more surprising was when she showed up at the Worlds in Italy ready to do her best against ten first international fields. For this all-important race, the '93 team rode a custom equipped with an all-new Yub-A-SO (final) with 26-inch wheels. With riders from over 30 countries attending, Nicole was the youngest competitor among them.

During her run, the weather deteriorated into a downpour and in the driving rain Nicole somehow managed by winning being riddled by arrows when she completed her first lap. After the race a collection of Americans were concerned because Nicole was nowhere to be found. The customary method, tapping around the 11 Chinese hotel lobby, happened to a Swedish, trying to find the keys to her room to get some dry clothes.

"We had our chance to speak to Nicole following the Worlds while she was waiting out a bad period (supposed to be by her cycling coach) before she could begin her winning winning program."

FROM SLEAZY TO FAT

BBB: How did you first get involved in cycling, and how did it come about?

Nicole: My first race was the local (Junior) Classic in popular (SUN) held on the young riders' team in Boulder in the summer of '90.

BBB: What is it that you like most about cycling versus other popular sports?

Having fun never. At 16 years old, I learned to become what was the youngest competitor at the 1993 NORBA Championships. This is the start of my life as a professional on both road and mountain bikes. M



Nicole: I used to run track and play soccer, but I got into cycling because not only does it keep you in shape, but you don't have to run around a track or walk a ball to a bunch of people. With mountain bikes it's all up to the individual and what you get into it.

BBB: We don't see too many young girls like yourself racing mountain bikes. Why do you think others are so few?

Nicole: Probably because there doesn't seem to be too many. Mountain bike racing isn't that hard, it just takes dedication. I guess most girls are more interested in going shopping at the mall. When you take riding seriously you can't go out late at night and party, but riding has a better reward to it all long run. Whether or not you do well, you always get away from a race knowing that you gave it your best effort. I like that part. Hopefully, most girls will get into the sport—the more the better.

BBB: What does the rest of the family think about your sport?

Nicole: They love it! They've always supported me, and my dad takes photos of me for my sponsors and helps me work on my bike. My brother and sister ride mountain bikes, but they don't race. They both play me a lot of computer, too, and my sister paid for me to ride to the Vermont NORBA National Fall.

BBB: How do you compare the road racing scene with mountain biking?

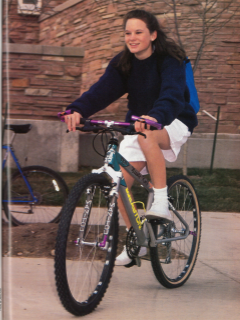
Nicole: I like mountain biking more now, but road racing helps me a lot, especially when the local roads aren't in good condition. Road racing is so intense; I like the laid-back style of mountain biking better because everyone seems to be having such a good time. I especially like it because my family likes it. We get to go to the races and camp out. They can all be helpful to the weekend. It's not like road racing, where you have to spend so much money to stay in hotels. Mountain biking gives you a chance to see more of the countryside.

THE TRAINING EXPERIENCE

BBB: What were your feelings about the Worlds leading up to the event?

Nicole: I was just thinking about the competition and what the race would be like. I was really anxious to get off the plane, especially since we were riding behind the starting station! It was my first try out of the country and my first race without my parents. Even though I missed them, it gave me the chance to take over, make my own decisions and do things to myself.

BBB: During your "retirement" from racing, how would you describe your priorities in life, Nicole? Would you be a professional cyclist or a cycling fan? Or would you be a...
Photo by [unreadable]





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NEW KID

MMB: How did the World's go for you?

Wanda: I started out really combined. It was a first start and I dropped my chain on the first climb. I caught up with a few girls, but once I started, I wasn't running a level head (as in I had to struggle for awhile). By then it was pushing three out and, as soon as I got going again, I hit a rock that I couldn't see with the rain in my eyes. My main hill must have been loose because my legs started vibrating and I couldn't tighten them. The spectators just visibly started to fall. I kept reminding myself that it was the Worlds, but then I started getting the stories, so I finally dropped out. I was really bummed because I wanted to finish. It was on the top of the second cable and then that really helped me get warm and made me come out. The whole team was there and they were really nice to me.

MMB: What lessons did you learn?

Wanda: The competitors at that level is really fast. The competitors are strong, but hopefully I'll be able to beat them at the '92 Worlds in Canada—that's my goal. It was a good experience, and now I know how hard I have to train.

MMB: How does cycling fit into your lifestyle?

Wanda: I like racing and I want to make it my career. Even though sometimes I want to do other things like go to a party, I know that my cycling is a long-term goal and I created myself that the other things are something I just want to do for the moment and then they don't mean as important anymore. There are some things that I'll have to pass up as I get older, but I'll have to make those decisions when I get them. I know it won't be hard, though sometimes bike racing is just what I want to do.

VITAL STATS

NAME: Wanda Marie Bolt
AGE: 24
RESIDENCE: 1617 17th Street, Ogden, Oregon
UNIVERSITY: Boulder, Colorado
POSITION: Top-Cable
CO-TRAINING: The Coast Shop, Victoria
BACKGROUND: MAJESTIC. You are a former professional triathlete. How did you get into cycling?
COACHES: In-Cable Specialized Tri-Cycle (Pleasanton, Texas), Peterstone (Seattle, Wash.)
ADDITIONAL COMPONENTS: Shimano SPD pedals with stainless spindles, Orica bar ends, Avidon 400mm handlebars, Shimano Ergo, King 100mm, Avidon 100mm stem
BIKE: Shimano SPD
PERSONAL TRANSPORTATION: "My bike is my partner."
LASTEST ACHIEVEMENT: "Winning cross-country, triathlon, and being out with my parents."

FAVORITE FOODS: "Bean burritos. I'm a bean freak. I love them and my mom's turkey steaks."
FAVORITE GROUP: "You know, I don't know. I like all kinds—except for men."
FAVORITE INDUSTRY AREA: "Marathon Mountain, California. There are just a lot of different places you can ride them."
FAVORITE INDUSTRY HERO: "Marionette and M. Snow, because they were both so well-supported."
MODEL: "I guess I have to say Lisa Ballentine. She's a really good racer and a good person. She's really nice."
LEADER: "My family, when I live, and

most of the people I meet at mountain bike races. I like school, work, and I like helping people."
CAREER: "I just want that POBBA and the USOC would be more supported."
GOALS: "To be winning the Regen class by the time I'm a senior in high school and to be at the top of the Dome class at the Worlds this year."
COMPETITIVE PERSONALITY: "You're from Coconino, Arizona, aren't you?"
LOCATION: "I was at Park City, Utah, and stayed at the Mt. Snow, Vermont, Peak."
LAST WORDS: "Thanks to everyone who helped the last season and especially Lianne for helping me at the Worlds."

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MONGOOSE COMP

When a successful formula becomes standard practice

■ If the Mongoose bicycle line can be accused of one thing, it's of consistently being able to produce well-accepted mountain bikes for existing low prices. They did it last year with the BMX Team and they have done it again with the BMX Comp. From the aluminum frame at a retail price of \$450, the Comp buyer gets an impressive list of standard items plus a Shimano XT upgrade kit.

The Comp first caught our eye with its unique looking, two-tone black and gold paint scheme. When this bike actually arrived the gold had been turned into a mottled color, but that was okay with us because it was just as unique. The Comp is also available in an electric-grape finish.

TRAIL OR PAVEMENT?

For the price, neither item is the bike that we didn't expect to find was the Shimano Deore XT Rapidfire Plus shifters. The rear top-of-the-line shifter was a big step up in terms of shifting precision and quality. However, the unexpected coming call for the rear-hand 100 cable. Mongoose's cable may get flexibility enough, the sub-\$700 Comp is equipped with the XT gear changers—what is dear! The rest of the group is derived from the LX catalog. We were surprised to find a short-throw derailleur on the rear. These need to be a big favorite among the XCERS. The riders who performed the short-throw's precision and quick shifts. He warned, however, that when raising the chain from the granny gear up those to any one of the three highest gears in the rear the derailleurs might have a problem keeping the chain out. "I mean, you're never supposed to ride cross-chain, but you know there are those moments when you lose track of what gear you're in and you just start pedaling for more. Slapping one of those gears or making the derailleurs work for a long-throw model would be the trick."

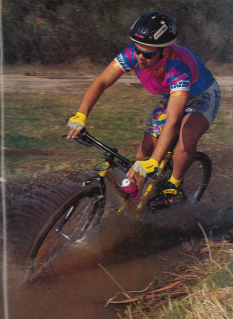
Though our test bike came equipped with Shimano's 321 Rapidfire Plus shifters, the electric-grape model is available with Shimano top-mount shifters (for \$300 less). We like the idea of one easily getting a electric in numbers, but shifter as well. Mongoose gets three shots for providing the opposite—three-shifters aren't dead yet!

BITS & PIECES

Want brand parts? The Comp has them from 220 1020 with ProSource (800) 426-2626 (www.prosource.com).



Numbers game For the bottom cranks in all of us the Mongoose Comp has 32mm cranks. That's not a stout crank in the short cranks as necessary for the most off-road work.



MONGOOSE COMP



Watch the wheels. Don't be pedaling the kids when someone shows up to steal or leave the group in the three highest gear. Behind the shift (gear) lever, the shifter won't be able to take up all the slack in the chain. Most pedaling you are sure to end up throwing the chain.

• **Align an eye.** You aren't here to worry about the Mongoose Comp's head and not being able to handle any off-road abuse you throw at it. Wide-Move CV-7 rear hub is mounted with the Mongoose handle bars, with a sturdy suspension, extremely fast along the steering. As far as that goes, the aluminum L.R. units should turn the side of the bike.

Close to zero money on the frame, fork and handlebars, which are all made from a new 4130 chrome-moly tubing. Despite the weight, which is the bike's

only real drawback, the Mongoose Comp is a well-rounded, attractive package. The rear rack mounts a rear rack, suspension, and the Snake class are contrast to



The aggression with its straight chromed steel and steel frame, the Mongoose Comp has a just-arriving feel to it. Just to the contrary, however, the bike also has its own style, for instance, because of the Mongoose Comp.

give you more freedom than you will ever need. For an entry-level bike, the Mongoose Comp is as it claims to be—competitive.



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By Dr. Jeff Spivack

■ MY ACHING KNEE

Dear MRB,

When I ride my mountain bike I get a aching pain in my right knee. My doctor says it might be too my knee after my ride, but the pain still remains. (John Minowka, Malibu, CA)

Painful as on your knee will help control inflammation but the more important question is: What is causing the pain? You have to know what the problem is so you can select the best course of treatment, otherwise you are just treating a symptom. The best place to do this is get an accurate diagnosis from a sports-oriented doctor. Then the best treatment option can be selected. The usual causes of knee pain in cycling are: iliotibial band syndrome and patellar tendinitis. Patellar tendinitis produces pain on the front of the knee. Walking down stairs and riding up hills both increase the pain. Both IT band and patellar pain can be

on the inside of the knee. Their pain is very similar, and both can be primarily managed by the control of movement. The frustrating part about these pains is that even with rest for prolonged periods of time, when normal activities are resumed they can reoccur as soon as you start riding. The most effective treatment is to combine some form of anti-inflammatory medication with rest. That is, that doesn't mean if, continue to ride them are fixed. The final option is surgery.

■ HEART ATTACK

Dear MRB,

I am 24 years old and just recently started training, with a heart rate monitor. I figured out that if my heart rate stays above 173 bpm without going above 180 bpm, I am getting no-actual workout. My question is, how long should I keep up my heart rate at those levels? When should I take breaks for stretching and water intake and to my heart rate come down? Should I take with intervals? If so, how? Can hot and fast days when should I train during the week for getting in good cycling shape?

Nease Garcia
San Clemente, CA

The answer to your question depends on your current level of fitness training, your training the frequency and what you are training for. Making your heart rate allow your training should be based on your own personal threshold can be done during training. The best time to after training and before bed. Your heart rate should be allowed to drop to around 130 bpm during the cool-down period following your third effort. During

warm-ups periods which provide hard training. The maximum is heart rate of 130-170 bpm. If you want to get tough, intervals are the way to do it. They can be done in a variety of ways: a simple workout is 20 minutes of 90 rpm at 70 percent power, followed by 40 to 60 minutes of intervals, with two minutes on at 85 percent output and four minutes off at 70 percent output. Finish with a 70- to 90-minute cool-down period in a small gear. If you ride three six or seven days a week, you should. The maximum is four days.

■ TROUBLE HAPPY

Dear MRB,

I am 16 years old and have been riding for seven years. I just finished my first year of mountain bike racing and want to move up to the Open class for '92. My biggest problem is that I have an aching pain in my lower leg when I am warming up before races. When the race starts I get immediate very quickly, get cramps in my abdominal muscles and fall off the bike. I have some abnormal gaiter points (area of repetitive pain in the muscles, sometimes causing referred pain in another location) in these muscles that last for a couple of days after the race. I could not compete in triathlons and have these symptoms like racing road bike due to the intense effort required right from the start. What more that I have completed to start on a road or triathlon but it never fall off. Do you have any suggestions that would help keep me from getting so winded? Also, do you suggest to the athletes you work with that they get regular sports massages?

A.J. Burk-Manning
Monterey, CA

Start by getting your gaiter points worked to see if they are the cause of your problem. (proprioceptive in the muscle fibers and movement isokinetic compression

pressure applied to stop blood flow to the area.) A proper warm-up before the day before your race. You should always ride the day before for 30 minutes in one hour of easy riding with a short, high-intensity burst in the middle. This can warm-up the cycling muscles in a few years and gradually increasing your effort and pushing until you get a good sweat going. If you are not sweating, you have not performed a proper warm-up. Use a hot water bottle (containing for a few minutes) for 15 minutes off the bike, then get hot and roll around easy before you go to the start. Make sure your heart rate is completed to 175 minutes before going to the line to allow for adequate recovery.

■ SKIN DEEP

Dear MRB,

My friends and I are in a bit of a bind over the issue of whether it is necessary to use an artificial base before to warm up the muscles before heading out on our ride. It is necessary, right? Henry Ford
Santa Barbara, CA

There is no substitute for a proper physical warm-up. Heat treatments warm the skin and can be used as a lubricant for the musculo-tendon unit. An important factor in warming up, but they are not critical in the warming up. In a cold day they can be used on the legs to provide a burst of circulation against the cold and prevent chattering until it is uncomfortable. □

Jeff Spivack, Certified Doctor of Chiropractic, is a sports therapy specialist who has worked with Olympic cyclists, professional triathletes and National mountain stars. His office is at 1011 Broadview Ave., Irvine, CA 92618, 949-244-0887.

Start by getting your gaiter points worked to see if they are the cause of your problem. (proprioceptive in the muscle fibers and movement isokinetic compression

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-Rocky



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Quick Releases



► PRO-LIGHT MTB STEM

AT's new Pro-Light MTB stem weighs in at a mere 200 grams and stands for just \$80.00. The welded set of 500-series aluminum tubing for rigidity and light weight. Pro-Light stems come in three different extensions and three angles of rise, 1.80 degrees or 0-degree. All three different stem sizes are offered in stock. The stems are made in Italy. For more information, contact Velopac Marketing, 11000 Liberty St., El Cerrito, CA 94530, or call (510) 230-0383.



► ANSWER ACCESSORY GRIP

The new Answer grip by Answer Products is designed for optimum comfort and grip for any handlebar. Design innovations include a unique position in the palm area for shock absorption, a smooth anti-bubble surface for your thumb and, last but not least, a unified pattern on the underside for finger motion. The Answer Accessory is composed of Kevlar-29 tubes composed of cross-grip ribs (the palm side) and further information, contact Answer Products, Inc., 27480 Avenida del, Valencia, CA 91050, or call (909) 257-4411.



► GOLD-BENTY BICYCLES

The new gravel-Bent, (Bent's mountain bike) are made with Kitcher Logic (Pentagon tubing) and are available in custom sizing. Complete bikes can be purchased with full-size 26" Comp or Moon Drive, or Minotaur

Drive. XT components for a small price of \$1195. Frame and forks can also be purchased for \$200. The standard color is black, but custom colors are available as well. For more details contact 780 S. Stone Ln., Ukiah, CA 95482, or call (707) 462-8435.

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Quick Releases



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