

# Recumbent Cyclist News

RCN 084 A Publication by and for Recumbent Enthusiasts Since 1990 Sept./Oct. 2004



RCN Reader Mark Libner clowns around on his Bacchetta Giro. See Mark's 5,000 mile road test article on page 18.



## The Greenspeed GT-3

By Bob Bryant

*"Since 1990 Greenspeed has been designing and building recumbent trikes for everyday use, be it commuting or touring the world, and these trikes have been handbuilt in small numbers, using the best quality components. Thus, compared to mass-produced bikes, the cost has been fairly high.*

*As more and more people appreciate the advantages of the recumbent trike, we find that more and more occasional and recreational riders also want trikes. So how do we help these people?*

*During our market research we found that these people often put their bikes on their cars and drive to their favorite riding place. Since our mission on this small planet is to get more people cycling more often, we decided that if we could produce a folding trike that fit in the trunk of a car, and if we made it in large enough numbers so that the price could be lowered, people might be comfortable enough riding their trike to run their cars less, and make our planet a better place to live." — Ian Sims*

**S**o you've always wanted a tadpole recumbent tricycle, but you didn't have the vehicle to haul one, or they are just too big and bulky to store? Greenspeed is perhaps the world's most respected trike manufacturer. For 2004, they have produced a new model, the GT-3, which has 16-inch wheels, a folding frame and a removable seat. This trike will fit into the trunk of many small cars (see photo on page 10). The GT-3 is also the most affordable Greenspeed trike, and is readily available from North American dealers.

### SYSTEMS

**Frame:** The frame is fabricated in Taiwan

for Greenspeed in two sizes and is made of 4130 TIG welded Cromoly. The first 50 or so frames were built in Australia; after that, assembly will be done in Taiwan. The seat separates from the frame via one Allen bolt under the seat base. Removal or reinstall is not exactly quick, but takes no more than a minute or two. The upper seat supports just pop into place via a male/female plug and are held via the one Allen bolt.

**Folding:** The GT-3 is very compact. Its folded size with wheels and rack attached is 36" x 33" x 21". Folding or unfolding takes less than one minute. The boxed shipping size with wheels, cranks and rack removed is 30"

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Check out our updated website at:  
[www.recumbentcyclistnews.com](http://www.recumbentcyclistnews.com)

# Recumbent Cyclist News

"A newsletter by and for recumbent bicycle enthusiasts, since 1990."

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# Editorial License: Weight, Performance & Comfort

by Bob Bryant, Publisher  
bob@recumbencyclistnews.com

**W**eight is a serious issue with bicycle buyers — upright or recumbent. Gram counting has become an ongoing obsession amongst lycra-clad recumbent roadies. Everybody wants to know:

- Does weight matter?
- How does it matter?
- How much is too heavy?

The fact is that bike and wheel weight does matter — most all recumbents are heavy by modern road bike standards.

Like many of you, I spent much of July watching the Tour de France. In fact, I became consumed by it. I also watched the Lance Chronicles which showcases Lance Armstrong, the US Postal team and his Trek bikes. On one particular segment a behind the scenes view of the Trek factory and some of the new carbon-fiber road bike technology. Trek can produce a road bike that weighs just 14 pounds! The minimum racing weight for a Tour de France bike is 14.991 pounds.

One thing is for certain, it will be difficult for the recumbent world to take advantage of this Trek-like bicycle technology. As an industry, we do we need to get out from behind the eight ball and catch up if we're going to compete. Recumbents need to go on a diet.

## Rider Weight & Fitness

Before we spend thousands of dollars buying lighter models, upgrading to lighter components or performance enhancing products, we also need to consider our body weight and fitness levels. Since we're talking about human-powered bicycles, and not motor vehicles, the condition of our own motors and bodies plays an important part in the equation.

Those who spend big bucks on fast recumbents should really be training thousands of miles per year, and be as fit as they can be. Losing bad habits like smoking, drinking and fast food helps as well. Sorry if this sounds preachy, I'm not perfect either. For me, this is a lifelong quest.

## Comfort & Performance

Some recumbent riders may be trading off comfort for performance. Some of the current go-fast bikes have reclined seats (possibility of neck discomfort), stiff frames (stiff ride) and high foot positions (possibility of numb feet and/or toes). Most will agree that the hard-shell seats perform better than mesh; however, are they as comfortable? You will need to decide

whether or not these trade-offs bother you, and if they do — are they worthwhile?

My primary motivation for riding a recumbent is COMFORT. If performance comes, it is an additional benefit. Sadly, there are far too many heavy and sluggish recumbents being sold today. If you want a fast recumbent, look for a known performance oriented recumbent and then see if it's comfortable for you. These will most likely be one of the following: highracer, lowracer, faired SWB OSS, or faired LWB OSS (in no particular order). Fast trikes exist, but I've always been faster on two wheelers.

## Hills & Weight

An interesting fact about going downhill is that a heavier bike will go faster (if all else is equal). On flats it probably doesn't matter as much, especially if you've spent some of your precious grams on a fairing and some performance tires. Where weight can "get you" is climbing. Those who charge and attack hills on recumbents like their roadie counterparts are a rare breed and usually riding highracers or lowracers. Most recumbent riders tend to gear down and spin up hills at a slow to moderate pace.

Some riders are not concerned about weight at all, but are still fast. One such rider I know has an Easy Racer TiRush. While not a heavy bike, his is loaded with goodies: rack, fenders, double leg kick stand, body sock, and fairing. I asked him how much it weighed, and he gave me an all-knowing "why would I care" look and a shrug of the shoulders. Few in this county can keep up with him.

## Performance Devices

With recumbents, we need to ask ourselves whether certain performance aiding devices are worth the added weight. These items could be:

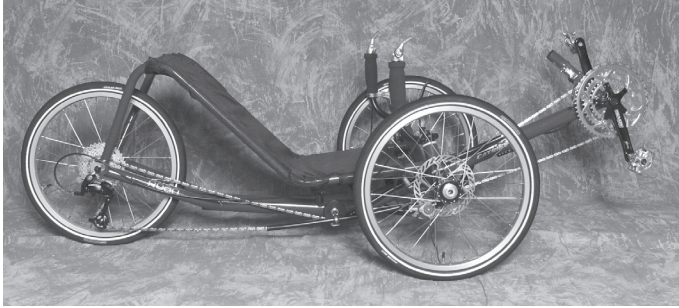
- Wider range gearing
- Components (like the Rotor crank)
- Fairings/body stockings
- Tail boxes

All of these items may be worth their weight for flat land or downhill riding, but they absolutely add weight which can slow you down in climbs. Some may argue that your flat land speeds will be higher, which will help you up the rolling (smaller) hills.

Easy Racer LWB bikes are made to have a front fairing and they work great and make the

*Continued on page 30*

# Recumbent News



Catrike's new 30-pound Road model sells for \$1995

## Catrike Institutes Limited Lifetime Warranty

Effective immediately, Big Cat HPV is extending a limited lifetime warranty on all Catrike frames to the original purchaser. Previously, the warranty period had been five years.

"We're committed to delivering the best possible value to our customers," said Paulo Camasmie, founder of Big Cat HPV. "Extending a lifetime warranty is just one more example of that philosophy."

The new warranty covers not only tricycles manufactured from this date forward, but also all 2003 Catrikes. "We're grandfathering all of the Speeds we built last year," Camasmie said. "We're very confident in the quality and strength of our design."

Big Cat HPV's mission is to deliver human-powered vehicles that offer outstanding design and very high build quality at a reasonable price. All Catrikes are built with pride in the United States of America.

Source: Big Cat HPV, [www.catrike.com/](http://www.catrike.com/)

## Catrikes Now Available Through Amazon.com


We are proud to announce that Big Cat Human Powered Vehicles have established an exclusive deal with Amazon.com to sell Catrikes online. This will not only promote and enhance Catrike sales to the mainstream market but will also help promoting cycling and recumbent products to prospects that would not look for recumbents or trikes otherwise.

Big Cat continues fully committed with our network of dealers and this will only grow stronger. In our opinion nothing replaces the convenience of buying from a dealer. Big Cat is operating with Amazon on a Beta at this stage and it is limiting the units available through this channel. There is not an economical advantage in purchasing from Amazon over a dealer. It is just a convenience for those who don't have a dealer nearby.

What triggered the decision was the fact that Big Cat had a substantial amount of requests of customers outside a dealer's area that wants to purchase the Catrikes. Another cool feature of Amazon, is that current Catrike owners wanting to upgrade to a new Catrike, can sell their Catrikes online through Amazon used sales.

In order to match the exponential demand for the Catrike, Big Cat is moving into a new building, four times the current size and hiring as well as purchasing new and more modern equipment.

Source:  
Big Cat HPV  
[www.catrike.com/](http://www.catrike.com/)

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Velocar discovery — The Bruce Weiner Microcar Museum, (aka Dubble Bubble Acres — the owner owns Dubble Bubble Gum and the cars are called bubble cars) includes an historic Velocar recumbent bicycle, and at least six pedal cars and light motorcars that were also built by the Mochet family. The museum is located near Madison, GA, 50 miles East of Atlanta (John Riley)



Glen Druery and his Optima Baron with Rotor Cranks

## Rotor Cranks at the Greenspeed Human Powered Vehicle Challenge

Rotor Cranks at the Greenspeed Human Powered Vehicle Challenge Australian Glenn Druery rides an Optima Baron Lowracer with no fairings. His bike is outfitted with Rotor Cranks. He recently competed in the GREENSPEED Human-Powered Vehicle Challenge for the Australian National Recumbent titles where he raced against fully and partially faired bikes. Glenn Druery came; 1st in the hillclimb, 2nd in the 2.5km Time Trial, only beaten by a fully faired bike (streamliner), 3rd in the 25km road race and 2nd in the 200m sprint with a max speed of 60km/h into a 25km head wind He reports that he loves his Rotor Cranks

For more info on the event: (<http://sunsite.anu.edu.au/community/ozhvp/2004challenge.htm>).

For more info on Rotor Cranks: (<http://www.rotorcranksusa.com>).

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## The ReBirth of Cool!(?)



*The Giant Stiletto*

### Chopper Bicycles

I've been riding long wheelbase recumbents for nearly two decades and trying to understand why a LWB recumbent is still a small niche and the Schwinn Sting-Ray will be selling thousands and thousands through your local Wal-Mart Store. I guess I answered this ridiculous query with the word Wal-Mart. Cheap prices and Wal-Mart go hand in hand. The Sting-Ray doesn't sell for \$4,000, no not \$1,000, not even \$400. You can order one for \$180. Giant's better equipped Stiletto is slated to sell for \$400. So one reason they will be so popular is that they are CHEAP. The next reason why they will be so popular is that they don't have the lawn chair style seat. They have chopper style

seats that look cool but probably aren't that comfy.

While riding down the street the other day I came upon my first Schwinn Sting-Ray chopper going down the road. The preteen was cruising along at about 10 mpg "styl'in" down the road. I pulled up along side of him and told him how cool his Sting-Ray was. I mentioned that I had one of the originals back in 1969. He nodded approval and I cruised past. I didn't tell him that this one bike led to a lifelong obsession with weird bicycles. Perhaps he'll be so lucky.

While these bikes are pretty cool looking, and they have some recumbent traits, they are really poser bikes — which is sad. Perhaps when somebody builds a chopper recumbent based on a Sun, Cycle Genius Easy Racer or Lightfoot long wheelbase recumbent — we'll really have something to talk about.

The Schwinn Sting-Ray is perhaps THE most popular bicycle in American history. For 2004, the new Schwinn Bicycle Company has unveiled its all-new Sting-Ray. This new bike is an exciting, chopper-style ride for boys ages 8 to 12. It features drag handlebars, a low-ride studded saddle, and the signature Big Boa Tire — just like a motorcycle!

The new Sting-Ray takes its cues from the great American chopper. The bike has a custom-stretched chopper frame with gas tank gusset, a 20" x 4" super wide rear slick tire, a 24" x 2" narrow front tire mounted on an alloy rim, an adjustable cruising saddle with built-in sissy bar, a dual crown, twin-barrel chrome forks with color-matching paint, chrome steel chain guard and heavy-duty double-leg wishbone kickstand and clear-coated Schwinn flame decals. The single speed bike has one alloy linear pull brake and three-piece custom Sting-Ray cranks with iron cross pedals. The weight is approximately 40 pounds.

The bike's design pays homage to the original banana seat Sting-Ray, but this modern interpretation reflects the public's interest in customized motorcycles. Add to that the Sting-Ray's partnership with America's premier chop shop, Orange County Choppers, and you've got the coolest bike around.

The new Sting-Ray cruises into Wal-Mart, Toys "R" Us and other

*Continued on page 29*

## RCN Calendar

### Michigan Recumbent Rally — West

September 11th 10am-3pm  
Hastings (south of Grand Rapids), Michigan  
Contact: 734-487-9058, [www.wolverbents.org](http://www.wolverbents.org)

### Fall Recumbent Rendezvous

September 18th  
North Detroit (Stoney Creek Metropark), Michigan  
Contact: 734-487-9058, [www.wolverbents.org](http://www.wolverbents.org)

### Planning an event?

Email: [bob@recumbencyclistnews.com](mailto:bob@recumbencyclistnews.com).



*The 2004 Schwinn Sting-Ray*



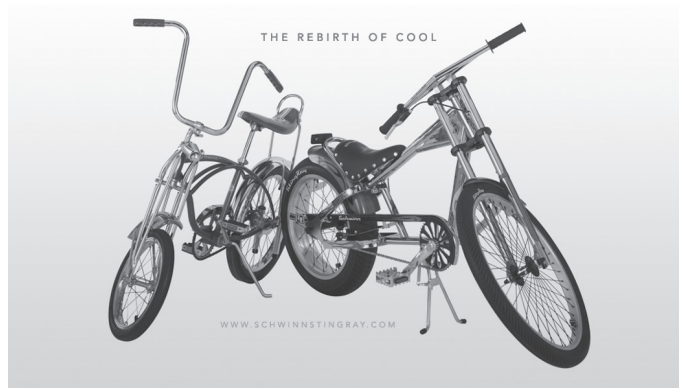
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*The classic Sting-Ray (left) and 2004 model (right)*



*Top two finishers in the 75-mile recumbent bike race, John Schlitter (left) of Hayes, Kan., and Jim Verheul of Westlake Village, Calif., relax after the race. Both were enthusiastic about the course and conditions.*

# The Wasco Wild West 75-Mile Recumbent Race

**By Rodger Nichols  
The Dalles Chronicle**

**T**hey came from as far away as Kansas, Colorado and California, bearing spidery contraptions of carbon fiber and titanium, aluminum, Teflon and precision-machined gears. They came, on May Day, to the Petersburg School in The Dalles, Oregon, to challenge themselves and to have a good time. The event was the first Wasco Wild West 75-Mile Recumbent Bike Race.

What the riders found was a twisty, curvy course through the rolling hills of Fifteenmile Road, including an eight percent uphill grade and a two-mile downhill run, crossing back to Eightmile and the school again. Four times

around gave them 75 miles of leg-burning exhilaration. "It's beautiful," said John Schlitter of Hayes, Kansas, who crossed the finish line in three hours and 41 minutes, averaging 19.87 miles per hour. "It's an honest course," he added. "It makes you earn it." That's high praise coming from a rider of his stature. The week before, he and his Bacchetta Aero were winning the 167-mile Cross Florida race. Later he would tell race organizer Clay Smith that it was the finest road course he had ever raced, and that he would work to make it the national championship site for next year. "That would be fantastic," said Smith, who was the tireless

organizer and promoter of the event.

Though only 13 riders showed up for this first go-around, their enthusiasm was universal. "The course was great," said John Cunningham of Peyton, Colorado, who was contending for third place until he blew a tire and lost valuable time. "We had very little traffic, and what traffic we did have was friendly. They would go wide around us and wave." Smith, who organized crews of volunteers to flag traffic, staff the checkpoints and time the racers, said he was pleased with the final outcome. "We got good advance stories in the bike press," he said, "and the riders have already written articles about the event on the Internet." Smith has plenty of experience in staging such events, having been both a rider and a volunteer with the Aluminum Man Triathlon for a number of years. He believes The Dalles has a serious chance of becoming a regular part of the recumbent bike racing circuit, since the sport is so young.

Though the sport is young, the recumbent design itself is old, dating back to the late 1800s. Peugeot, one of the world's oldest and leading manufacturers, designed and sold thousands of them after its entry into the field in 1905. Advocates for the style claim it would likely be the dominant design today if not for a decision made in 1934 by United Cyclists Internationale, the bike racing sanctioning body. After a second-rate rider named Francis Faure set a new world record for the hour, covering 45,056 kilometers (27.9 miles), the UCI banned recumbents from sanctioned races. That decision effectively killed the design for nearly five decades. It wasn't until 1979 that the first modern-era recumbents (or 'bents, as current riders often call them) were produced. Their efforts were spurred by chemical giant DuPont's announcement of a \$15,000 prize for the first human-powered vehicle to reach 65 miles per hour. A rider affectionately known as "Fast Freddy" Markham captured the prize in 1986.

Those who have tried the modern recumbents tend to be adherents. "They can be ridden for hours and miles without ailments such as the sore butt, stiff neck, aching shoulders or numb hands that afflict the conventional bicycle rider," writes Martin Krieg who has made crossings of the United States on both uprights and recumbents. "The recumbent rider experiences far greater comfort, a better view of the world, a toning and strengthening of the abdomen, even a better sun tanning position."

"And no, they are not dangerous. In fact the lower center of gravity and greater proximity to the ground mean that if you should crash on one, your feet will absorb most of the shock instead of your head. Because more of your weight is over the rear wheel, recumbents also stop faster. Cars see you better, too, because the biggest part of your body is in the car

driver's field of vision and you do not blend in with pedestrians, joggers or conventional bicyclists."

The design is still banned from racing in the upright bike circuit, which has led to the formation of various sanctioning bodies. Saturday's race was sanctioned by the Oregon Human Powered Vehicle club (OHPV). Smith said that the success of Saturday's race would not have been possible without the help of many local volunteers, most of them cycle enthusiasts. "Mike Bertrand was a big help," Smith said, "As was Dr. Schwarz. Ryan Rooper supplied the official energy drink and a lot of people gave up their Saturday to staff the positions." He was also grateful to area farmers and residents for their cooperation and patience. "Once they saw how little it would disrupt traffic, and that we were respectful of the Petersburg School facility, there was no problem."

**Note:** You can find full coverage of the event, with photos, at <http://www.ohpv.org/wasco2004/index.htm>. ♦



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Atlantic Bicycle is one of the east's largest recumbent dealers offering models from RANS, Haluzak, Lightning, Easy Racers, Burley, Sun and others.

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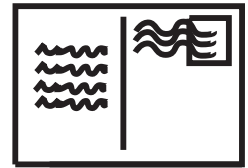
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# Letters To RCN

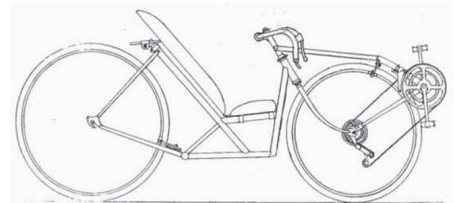
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View of early tube-frame FWD recumbent with my version of the "Rotor Crank"



Author Tom Traylor and his creation



The Traylor FWD recumbent

## Rotor Crank

I was intrigued by a letter in RCN 080 about a new kind of crank called the "Rotor Crank." It looked and sounded similar to a crank that I designed and built about 15 years ago. I forgot all about this letter until a few weeks ago when I recently got a chance to see one. It sure looked like my crank. So when I got home I looked it up on the Internet to get a better look at it, and I felt like a load of bricks had fallen on me. It wasn't just similar to mine — it was mine — every function and detail was the same. Now before you say, "Yeah, right, he's taking credit for inventing the Rotor Crank," I have pictures and patent applications to prove it.

About 15 years ago I was interested in designing something that gave a cyclist a slight change of pedal-to-chain-ring ratio and take more advantage of the mechanical advantage of different effort points around the pedal circumference. After many months of sketches and cardboard mock-ups I came up with exactly the same solution that the folks at Rotor Crank did. The chain ring is on an offset center from the crank arms. The crank arms are on the same shaft which goes through the regular bottom bracket position, but they are not attached to each other. The right hand crank arm has its own bearing and oscillates back and forth in relation to the left arm. Both crank arms are attached to the chain ring by short links. As the whole unit rotates the crank arms precede and then recede in relation to each other.

When I built this crank I was reasonably sure that I was the original inventor, so I hired a patent attorney. Leave it to me to find the most incompetent one around. He took a look at it and said, "Wow! That thing is really weird! You won't have any problem getting a patent on that. Give me \$2,000 and I'll send in an application."

A few months later I got a big packet from the Patent Office. The first paper I pulled out said that my patent had been denied because there are other patents covering the same invention. So much for trusting your attorney. The rest of the papers were copies of the other patents, four American, one Dutch, and one English. Most of these patents were slightly different from mine and I probably could have gotten around them, but the oldest one, from England, was exactly like mine, and exactly like the Rotor Crank as well. That patent was a hundred years old.

I have to give credit to the Rotor Crank people for pursuing this project. The Rotor-type crank has literally thousands of possible settings and adjustments, but they evidently got the right combination. I might even buy one just to see what my project could have been.

Tom Traylor

**Editor Comments:** *In case you are wondering about the very cool front wheel drive (FWD) recumbent this is Tom Traylor's design. You can find out more information about it at his website: [http://traylorfwd.home.mindspring.com/bike\\_plans.html](http://traylorfwd.home.mindspring.com/bike_plans.html) where he sells building plans for \$15.*

## RCN 082 — Long Wheelbase

Another sleep deprivation day after receiving an RCN. At 1:30 AM I finally turned the last page. Must say, this issue had a LOT of good stuff in it. Really enjoyed it! The additional comments by Gardner Martin after the LWB Front Wheel Skidding article made me once again realize how lucky we all are that Gardner is the type of person who willingly and gladly takes his time to share his brilliance and common sense. How many people (in other areas of business) would be as open and willing as he is? I also give high marks to Bruce

Buckmaster in the RCN 082 Letters column (pg. 5). We need more common sense like that!

We are all fortunate to have people willing to share their knowledge, and to take the time to do it. We are all fortunate too that you, Bob Bryant, are still putting out this great magazine, and continue to do so with all its ups and downs.

When reading these pages I also realize how lucky I am to be living in the Portland, Oregon area where there are not only a lot of recumbent riders, but a lot of support. We have Coventry Cycle Works, the rides and annual Human Power Challenge sponsored by OHPV (Oregon Human Powered Vehicles) the advocacy efforts of the Bicycle Transportation Alliance (BTA) and, of course, our own Easy Riders Recumbent Club Magazine.

Bicycles are allowed on public transportation, there is quite a maze of bicycle lanes, and paths, we even have . . . Critical Mass, part of a worldwide movement of bicycle activists (See: <http://criticalmassrides.info/>). And yes, our police ride around on bicycles! We are fortunate to have recumbent businesses here such as Terra Cycles (Pat Franz), and Stites Design (Bill Stites), and many people who like to tear up wedgies and turn them into recumbent creations.

While the numbers on national sales sheets may not show a great increase in the number of recumbent bicycles being sold, when we all look around we realize the enthusiasm is here in the people, and the activities are growing. If you possibly can, attend the Annual Recumbent Retreat ([www.recumbentretreat.org](http://www.recumbentretreat.org)) every August in Fort Stevens State Park. If you thought recumbents have leveled out . . . this may change your mind.

Connie McAyeal  
ohyesbent@hotmail.com

## BikeE Parts

Do you know of any dealer that sells BikeE parts now that they are no longer in business?  
Rick Sprague

**Editor's Comment:** *There are dealers with*



*BikeE parts available. You might be able to buy the fairing from Mueller directly (see RCN sponsor links). For the seat, try Easy Street Recumbents (sponsor links) or Calhoun Cycle in Minneapolis (web search). They offer an adapter that places a RANS base on the BikeE frame.*

## RCN Future

I love the magazine, and wish you many more years of successful operation. You're quite right that it's very nice to have a real piece of paper to take to the reading room . . . but here's one thought for you: If times get really tough, you might consider a paperless .pdf subscription. This would cut production costs substantially. I like the paper, but I'd subscribe to both. I tend not to take the paper with me when I travel, for fear of losing it, so I would also love to have RCN on my laptop.

As regards the booties, here is my suggestion. Buy a box of clean room booties (a quick web search turned up a box of 300 for \$49. They are really light weight material which pull over your street shoes to keep electronics labs (and sometimes hospital operating rooms) clean. Perfect for this application.

All you need to do is pull them on and slit the bottom for the cleat with a very sharp pocket knife or razor blade. Check with your local hospital to see if they'll let you have a pair to try out.

Tom Frank  
taf@wiredwizard.com

## Body Socks

I'm a loyal RCN subscriber and I have a question. I believe I saw a small blurb about a company which makes replacement spandex bodywraps for fully-faired `bents, such as my Lightning F-40. If so, can you send me the contact information?

Mark Mallach

**Editor's Comment:** *We found this information thanks to Laurie "Wo" Smith of the Easy Rider Recumbent Club: Check with Free Form Fashions in Santa Cruz, CA). The email address is fffashions@hotmail.com, and remember to mention that "Wo" sent ya'! :)*

## RCN 079: Gearing Rant

One of the best things about your magazine format (as opposed to internet publications) is the ability to scan old issues and rediscover articles which are more relevant and meaningful the second time. That is what happened when I re-read RCN 079. Your article on gearing was a big help. My commuter bike is a 2002 RANS V-Rex. It has a stock 30/42/52 175 mm crank on it. I found the gearing worked well and the V-Rex provided good performance, but for commuting I encountered a slight knee soreness and strained legs after some of my rides.

Your article caused me to rethink my gearing. I eventually swapped out the stock crankset for a Shimano Deore LX 26/38/48 170 mm crankset. I can't tell you how many gear inches I dropped but the difference on my legs and my ability to keep spinning at 90-95 rpm with less stress was noticeable. I may have dropped 1/10th mph on my overall average speed, but I still hit speeds in excess of 25 mph on my commute. Climbing is easier. This gearing change was a real improvement. Thanks for the pointers. It made a good commuter bike even better for this 58-year old rider.

Mike Stern

## Lightfoot Ranger Update

The Lightfoot Ranger is listed at a very beefy 40 pounds in your buyer's guide (RCN 081), but has actually been trimmed down a lot from the first over-engineered models. The Ranger is still a big, tough, capable bike, but it now weighs 34-36 pounds, depending upon the frame size. Our first priorities on all Lightfoot designs will remain safety, capability and dependability, but we aer constantly working to improve performance too.

Rod Miner  
Lightfoot Cycles

## Lance & Recumbents

I don't believe that the cost of a recumbent is what prevents more widespread acceptance in the cycling marketplace. Instead, I think that the absence of recumbents in serious competition plays a larger role. If Lance Armstrong won the Tour de France on a recumbent, every 20-something cyclist would want a recumbent, no matter what the cost, and everyone riding an expensive mountain bike as a street bike could afford to purchase a quality recumbent.

I have always wondered which cycling organizations and which rules lock recumbents out of serious competition. Why is there no agitation to change these stupid rules, which prevent the development of safer and more comfortable racing bicycles? Could any of these rules be circumvented by the new generation of dual 650mm wheeled highracers?

If we had a champion cyclist who won races with a recumbent, the public's perception of what constitutes a "normal" bicycle would change in a hurry.

Dr. Kim Henry

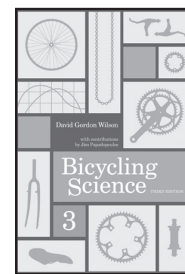
**Editor's Comment:** *This is a difficult undertaking. HPV and recumbent races are not the best attended or promoted events, mostly due to budgetary constraints and lack of volunteer help. Getting recumbents into organized road races will be another difficult, if not impossible feat.*

*Bike racing is a wonderful sport — I'm a fan. It's all about tradition, teamwork and at the upper levels, the science of the bikes and ultimate fitness. Recumbents don't really fit*

*into the team concept (peloton, drafting, etc.). A win against upright bikes just looks like cheating to upright riders (unfair aerodynamic advantage).*

*The average recumbent probably won't be faster in road racing or criterium events. A time trial is an ideal event for recumbents. After watching local Northwest road races and the Tour de France this past season, I don't buy into the anti-recumbent conspiracy theory anymore. If people want to race recumbents, it's time to get going on a racing association. A recumbent racing class run in conjunction with other road races or time trial events could be ideal. It will have to start on a local level. Get active in local bike racing circles to make it happen. If that isn't happening for you, buy a road bike for racing and enjoy your recum-*

Letters . . . Cont'd on page 28



## Bicycling Science

third edition

David Gordon Wilson  
with contributions by Jim Papadopoulos

"Bicycling Science is the bible for bicycle and human-powered vehicle development. It offers the reader a good understanding of the technical aspects of bicycle design, as well as a look back at where we've come from, and perhaps where we're going. Everyone involved in the bicycle industry should read this book—a real gem." — Bob Bryant, Publisher, *Recumbent Cyclist News*

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The MIT Press



GT-3 in a Toyota Echo hatchback



BikePro USA's P-FCS case is 26" x 32.5" x 14", weighs 25 pounds and costs \$400



At first glance the GT-3 make look like your average Greenspeed trike. However, it has 16" wheels (vs. a GTO's 20" wheels) and the width is 2.5" narrower than the GTO, which makes it easier to get it through door — and it folds.

x 28" x 15". To make it even more compact, the handlebars can be folded and the front wheels, rack and cranks can be removed.

To fold the GT-3, first undo the seat Allen bolt and remove the seat. With the seat removed, the main hinge is exposed. The hinge is offset, so as the frame folds, the rear wheel comes around next to the crank. The hinge has a quick release with a safely cam. Note that all adjustments, the cables and the chain stay in place when the trike is folded.

The GT-3 fits into a BikePro USA case (model P-FCS) that is 26" x 32.5" x 14", weighs 25 pounds and costs \$400 ([www.bikeprousa.com](http://www.bikeprousa.com)). In order to pack the bike into the case I had to remove the seat, handlebars, wheels, rack, boom,\* crank and fenders.\* (\*may not need to be removed). I could probably have the trike road-ready in 30-40 minutes.

**Steering:** The Greenspeed USS handlebars can be adjusted via an Allen bolt for width as well as fore-aft recline. It's a robust and refined system. The bars are aluminum and the stem is CroMo. The Greenspeed steering geometry is exceptionally smooth and effortless. There are no tense moments or awkward situations. Greenspeed uses CroMo kingpins that rotate on brass bushings. While I prefer cartridge bearing headsets, the Greenspeed system is time-proven, robust and trouble-free.

#### For

1. The most compact trike
2. Greenspeed reputation & quality
3. Folds up relatively quickly
4. Comfortable
5. Performs well

#### Against

1. A bit pricey for an entry level trike
2. Still a large package
3. Drum brakes (no disc option)
4. Fewer upgrades than other models
5. More rare 349 mm wheel size

#### Why Buy This Bike

It's a relatively affordable Greenspeed, it rides great and it will fold into the truck of your car.

#### Contact

Greenspeed  
Web: [www.greenspeed.com.au](http://www.greenspeed.com.au)

#### Specifications

**Model:** GT-3  
**Type:** Tadpole trike, folding  
**Size:** One size fits most  
**Wheelbase:** 39"  
**Track/Width:** 29.5"/32.5"  
**Seat height:** 10"  
**Pedal height:** 17.75"  
**Weight:** 38 pounds  
**Frame:** 4130 CroMo Taiwan  
**Price:** \$2595 at your Greenspeed dealer

#### Seat

**Back:** Laced mesh with lumbar  
**Base:** Laced mesh (one bolt mount)

#### Components

**Crank:** Shimano Tiagra 30/42/52  
**Bottom bracket:** Shimano sealed  
**Drivetrain:** Shimano Tiagra/Capreo  
**Cassette:** Shimano Capreo 9-26 9-speed  
**Shifters:** Shimano Dura Ace Bar-Cons  
**Chain —** Shimano HG 53  
**Gear inch range:** 19-95  
**Pedals:** Wellgo LU-983 platform  
**Wheels:** 16" x 1-3/8" 349 mm  
**Tires:** Primo Comet 1.375" 85 psi  
**Brakes:** Sturmey Archer Drums  
**Colors:** Red or blue with yellow seat



*The Shimano Capreo 9-26 cassette*

**Weight:** The GT-3 weighs in at 38 pounds. This seems light for a Cromoly recreational trike, though we've reviewed lighter trikes. Our 2002 GTO weighed 40 pounds with a rack (which is exactly what our 2004 GT-3 test trike weighs with the optional rack).

## DRIVETRAIN

**Components:** The focal point of the GT-3's components is the Shimano Capreo cassette with cogs of 9-26 teeth. This new component was designed specifically for small wheeled bicycles. It allows for higher gearing with small wheels than most cassettes that have an 11-tooth small cog. The Capreo rear derailleur and Tiagra front shifter by Dura Ace bar-cons shifted perfectly. After seeing and hearing more and more about twist grip failures, I'm more certain than ever that these venerable Shimano bar-ends are the best shifters in the cycling world. They are "old school," but easy to get used to. They work especially well on trikes with USS sidestick-type steering like the GT-3. The 170 mm Shimano Tiagra crankset is adequate, though not spectacular.

**Gearing:** The GT-3 has a very usable low gear range of 19-95. It's well suited for recreational and sport riding over varied and even hilly terrain. The Tiagra 30/42/52 crankset shifted smoothly, just like a road or mountain bike. The smooth Greenspeed upper chain idler and chain tubes manage the chain amazingly well — and it's definitely quieter than you'd expect.

**Braking:** While discs are the buzz in recumbent trikes, the GT-3 comes stock with retro-style Sturmey Archer drum brakes — and they stopped as fast as I'd ever need them too. Drum brakes seem to stop the smaller the wheel diameter better, so the 16" might be the best application for them. Discs are not available on the GT-3.

**Wheels and Tires:** The 16-inch size generally is harder on equipment (tires, rims spokes & hubs) than the larger sizes. When riding you barely notice the small size of the wheels. The wheels held true during our test period. The Primo Comets are fine sport touring tires. They are not robust tires, but perform adequately, are readily available and are priced right.

## COMFORT

The new Greenspeed seat with lumbar curve and the optional headrest was very comfy. The GT-3 has a relatively upright (for a Greenspeed, anyway) 40 degree seat recline angle, and it's not adjustable — so get used to it. 40 degrees is perfect for me: it's easy on my neck, and takes the weight off my bum. The headrest provided adequate support for my neck; however, since my natural tendency is to look around at traffic, some effort will be required to look straight ahead. You're unlikely to get recumbent butt on a Greenspeed. While the pedal



*The GT-3 folded*

height is 7.75" above the seat, the ergonomics work well and the trike was effortless to get used to. About the most difficult aspect to get accustomed too is the very low stature of this trike. The ground clearance is just 2.6 inches. The rear derailleur only clears the ground by 1.875". The lowness of the trike may be an issue for some — especially those who ride in traffic. I feel that it's up to the individual themselves to decide what is too low.

## RIDE

**Handling:** The GT-3 has a sharp turning radius that you'd expect from a microtrike, though it has the fine Greenspeed trademark "centre point" Ackermann steering and excellent stability. Greenspeed trike handling is about as good as it gets. The GT-3 handles exceptionally well and is stable and precise as one would expect, especially given the small wheels. I actually thought it might be twitchier than it was.

**Performance:** Though it has the small wheelset, it doesn't have a SRAM DualDrive. The drive train felt lively with no added friction. The trike performed well: it is reasonably fast and stable, yet feels quicker than a GTO or GTR.

**Climbing:** All Greenspeeds are excellent climbers. This one in particular has a nice low 19-gear inch low that is very suitable for climbing just about anything.

**The Ride:** While micro trikes tend to offer a more firm ride than do 26/20/20 or 20/20/20 trikes, the GT-3 was not as firm as I would have expected.

## PURCHASING & OWNING

**Utility:** Every Greenspeed trike we've reviewed is robust, reliable and can be utilitarian. While the GTO and GTR are probably a bit tougher, the GT-3 is no slouch. It's more compact, and stores and transports better — perhaps making it even more useable.

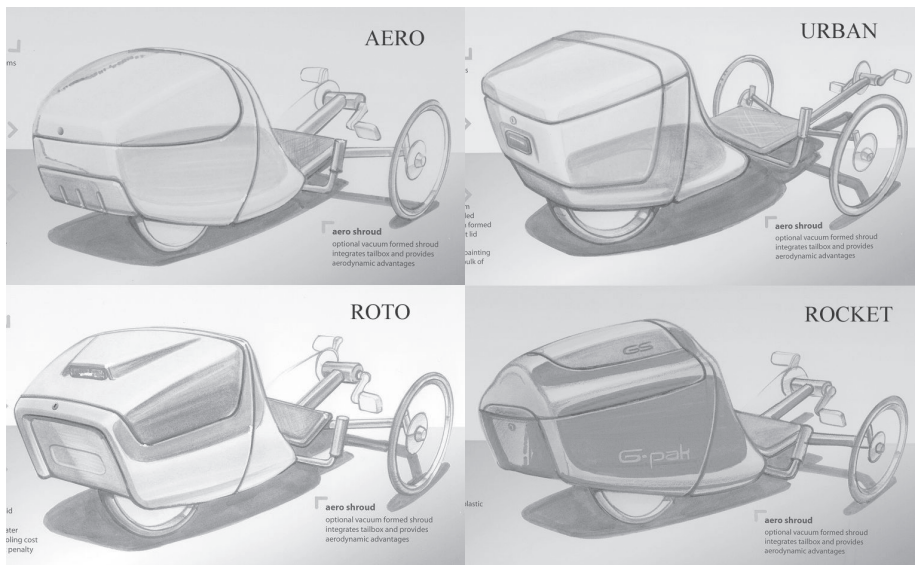
**Purchase Details:** The GT-3 is Greenspeed's "stock" trike. It's available in only two colors and one spec level. All other options are dealer installed.

In the past, Greenspeed trikes have not been the easiest recumbents to purchase. The primary reason is that you're dealing with a company in Australia. The prices are quoted in Australian dollars and do not include shipping and US duty — and there have been currency fluctuations which had the prices fluctuating up until the purchase was consummated.

Greenspeed has recently announced a new USA distributor that will greatly improve dealer and customer relations and purchase details in the following ways: Shipping costs will be reduced, prices will be locked down (no more currency fluctuations or conversions), and trikes will be shipped in larger quantities directly to the USA. Also, time of day



The Greenspeed UTE



Greenspeed's lockable tailbox concept drawings

contact will be improved with the new Greenspeed offices being in Highland, Illinois. For more information, contact: Greenspeed, Jerome Hediger, Tel. 866-314-4323, Email [jerome@greenspeed.com.au](mailto:jerome@greenspeed.com.au)

**Accessories:** The GT-3 comes with a rear fender, mirror, a safety flag and braze-ons for a Rohloff 14-speed internal hub, dynamo, front and rear lights, and Schlumpf 2-speed bottom bracket.

Options include a standard rack (\$40), a heavy duty rack (\$120), front fenders (\$108) and a second mirror (\$24). (Prices quoted are in US dollars.)

## MARKET

There are no other folding tadpole trikes. The GT-3 is in a league of its own.

If you want to compare it to Micro trikes, or like-trikes, you should compare it to the ICE

Micro and Mini, both of which are much more expensive; the Catrike Speed, which is lighter, more affordable and made of aluminum — but doesn't fold.

This past July ICE announced that two new trike models (a tour and a sport) would soon be available from \$2670 USD.

## VERDICT

The GT-3 is an awesome trike. It's the most affordable Greenspeed, it's compact, it rides wonderfully and it should have excellent resale value. The only criticism I can think of is the lack of disc brakes — which are not an option. Just about every other component on the trike can be updated by a dealer.

On the financial side, If the US dollar continues to tank, Greenspeed will continue to have a difficult time competing against the likes of Catrike and WizWheelz (both built

here in the US; no airfreight or duty costs). Also, the tanking of the US dollar has not and will not be good for any imported recumbent.

16" wheels are more of a hassle than 20's. The primary reason for using them is compactness. The GT-3 uses the 349mm 16" x 1-3/8" wheel which is primarily used for folding bicycles such as the Brompton and other European models. It's not often used on recumbents other than on a few micro trikes.

Recumbents trikes are difficult to haul and store. A folding trike is a great idea. The recumbent world could use a few more compact or folding models of all types.

Greenspeed has a long history of building world class robust recumbent trikes for nearly any use you can imagine. The GT-3 is a wonderful addition to the line. ♦

From the Greenspeed eNewsletter:

## GREENSPEED NEWS

**Full suspension:** We're still doing rear suspension on special order. We refined it last year, eliminating most of the pogo by adjusting the design. A major improvement to the feel of the ride came about when we tried the new Cain Creek Cloud Nine shock. Rear suspension on a GTR or a GTO costs approximately \$800 USD and front suspension is also \$800. Front suspension is done via longer kingpins and springs which we were pretty happy with but the Pantour hubs should make things a lot neater and be more easily "retrofitable."

**The GTU UTE** (Aussie slang for Utility Vehicle or pick-up truck). This will be a large capacity trike based on some commercial work we've been doing in Australia. The first prototype is completed and should make a debut on the website soon (see photo above).

**SLR Race trike:** We've started cutting out the tubing for a brand new prototype racing trike. This will be an evolutionary step beyond the GLR Low Racer. The GTX sports trike has now taken its place as a more practical and fast tourer.

**GTH redesign:** We hope to do a complete redesign this year to add the folding feature and make it more adjustable.

**Folding trikes:** we are looking at developing the trike in two different directions. The first is a model to fit smaller adults. Next will be a racing model.

**Fairings:** We're looking at a new head-out style full-body fairing. We have developed a new frame to which the fairing can be added.

**Disc Brakes:** The new Magura Disc brakes have been having some great field testing and have been working excellently.

**Tail Boxes:** We're working with a design company on lockable tail boxes for our trikes. We now have four possible designs. The objective was it had to be aero, look good, be practical, and hold at least 60 liters.

**Pannier Bags:** The New RT-60 Recumbent Pannier Bags are now shipping. ♦



Volae Club with XP Fairing & Mount.

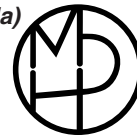
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## COMFORT...



## REDEFINED!



The Greenspeed  
GTO touring trike

### HOW DO YOU IMPROVE THE ULTIMATE TOURING TRIKE?

#### SEAT RESEARCH AND DEVELOPMENT

First we talked to our chiropractor about what riders need from a seat, and then with her help, and using measurements from over 500 riders, we made a number of prototypes. We tested them with many, many different riders. Eventually, using special bending equipment, we managed to 'mould' the seat tubes to fit the curvature of the human spine. Thus we combine the nice curved appearance of a hard shell moulded seat with the better suspension, shape conforming and ventilation qualities of sprung mesh seats. Just one sit is enough to tell you that a new standard of comfort has been reached!

#### STEERING UPGRADES

Research indicated that even with our centrepoint steering, there was some toe-out under heavy braking with the optional hydraulic disc brakes. Thus the steering has been re-designed to give a small amount of stabilising toe-in under braking. The difference in single wheel braking from high speed is quite marked. To line up better with the new kingpins, the handlebars have been moved to the top of the main tube, giving better ground clearance, and shorter bars. Plus they have been given more rake, so that they fit the hands better, yet are still in line with the pivot, eliminating any tiller effect.

#### NEW LUGGAGE RACK

Our new rack is made from high tensile aluminium tubing, by Massload. It weighs only 370g, yet has been tested successfully to 40kg. Thus we rate it at 30kg. It has a universal mounting plate for lights or reflectors, and a mudguard attachment point.

To find out more please visit our website, or email, write, fax, or phone. Let us help you find a dealer or owner near you for a test ride.

## GREENSPEED RECUMBENTS

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# RCN Reader Road Test: The ActionBent Jet Stream

By Jim Hall  
bentbiker@accesstoledo.com

"The Jet Stream is an affordable short wheel base (SWB), lightweight, under-seat-steering recumbent with features equal to bikes costing \$1500 or more.

The Jet Stream is extraordinarily stable for a SWB recumbent. This bike is fast, great-looking, and a BLAST to ride! ActionBent's mission is to deliver the world's best value in top-quality recumbent bicycles." — ActionBent

**A**bsolute value is ActionBent's mission. ActionBent offers several European styled SWB models in USS, OSS and with 26" or 700c rear wheels and 406 mm and 451 mm 20" front wheels — from \$700-\$1200, all priced lower than their peers.

ActionBent is owned by Randy Schulman of Redmond, Washington, who became the US importer for ActionBent two years ago. The ActionBent recumbents are built by the China Mascot bicycle company in Taiwan. Randy Schulman came to bents like most of us: he tried one out for exercise and fell in love.

The Jet Stream is the entry level SWB model and is available in three configurations:

- Jet Stream-1 (head tube mounted USS)
- Jet Stream-2 (wide cowhorn style USS; bars mounted to fork)
- Jet Stream OSS

## SYSTEMS

**Frame:** The welds on this imported Cromoly/HiTen frame are impeccable. The ActionBent frame sports a beautifully curved Cromoly main tube and chain stays which are very attractive. The triangulated rear frame is stiff.

The paint, silver on this one, is very lustrous. The downside is that paint isn't as durable as powder coating.

ActionBents have only a 3-year frame warranty, but the frame looks to be rock solid.

**Steering:** My Jet Stream-1 test bike has a direct USS with handlebars mounted into the headtube via a stem. The system works great with one exception: there is some handlebar/seat interference which limits the steering arc of the bike. The Jet Stream-2 solves this problem by mounting the bars to the fork



Jim Hall's ActionBent Jet Stream

## For

1. Exceptional value
2. Comfortable and efficient ride
3. Good specs for price
4. Very good fit & finish
5. Attractive looks

## Why Buy This Bike

If you're looking for an exceptional value in a SWB USS recumbent and don't mind the lack of dealer support, set-up or tinkering on your bike.

## Contact

ActionBent Recumbents  
Web: [www.actionbent.com](http://www.actionbent.com)

## Against

1. Direct sales only (no dealers)
2. Short frame warranty
3. New company with non-traditional marketing
4. Limited turning radius
5. Marginal chain management (idler)

## Specifications

**Model:** Jet Stream  
**Type:** SWB USS  
**Size:** One size fits most  
**Wheelbase:** 41"  
**Seat height:** 22.75"  
**Pedal height:** 24.75"  
**Weight:** 32 pounds  
**Frame:** CroMo & HiTen  
**Price:** Varies. \$595-\$715 + options, shipping and assembly

## Seat

**Shell:** Vented aluminum  
**Cover:** Vinyl covered foam

## Components

**Crank:** Alloy 28/38/48  
**Bottom bracket:** NA  
**Headset:** NA  
**Derailleurs:** SRAM X.7/Tiagra or 105 (front)  
**Cassette:** Shimano 11-34 9-speed  
**Shifters:** SRAM X.7 twist grip  
**Chain:** KMC  
**Gear inch range:** 22-109  
**Pedals:** Alloy  
**Wheels:** 26/20  
**Tires:** Primo Comet 1.5 (rear); 1.35 (front)  
**Brakes:** Avid or Tektro V  
**Colors:** Varies (yellow, black, red, blue or silver).

under the mainframe.

An over-seat steering (OSS) version is also available. This model uses a fixed OSS stem/riser. This could make for a confining cockpit for some, though an aftermarket fold-forward riser could be added.

**Weight:** The bike weighed 28.5 pounds on my scale. It could certainly be lightened up by upgrading some of the components.

## DRIVETRAIN

The drivetrain offers a SRAM X.7 rear derailleur with a Shimano 105 front derailleur shifted by SRAM X.7 twist grip shifters. The bike shifts well after a few minor adjustments.

**Chain Management:** The top and bottom chain both run over hard plastic idlers and a chain tube (top), which keeps chain grease off your leg. While the stock system works okay, several owners have modified their chain idler systems by experimenting with a Burley/Bacchetta type X-path crossover single idler and have had good success. I've modified my bike by removing the upper idler and just using the lower idler. The bike has good idler braze-ons that make these modifications easy. The stock idler creates noise/vibration on a par with other SWBs such as Vision or RANS.

**Gearing:** The triple crank and 8-speed cassette offer adequate gearing which will work well for the recreational rider for whom the bike is intended. Some flat land performance cyclists may want a higher gear, while those who climb steeper hills may want a lower low.

**Braking:** The Brakes are a good quality Tektro or Avid models which offer excellent stopping power.

**Wheels and Tires:** I figured that at this price, the wheels might be no good and I'd upgrade them. The rims are "Jetstep" brand with black inside and silver machined side walls. The hubs are "Star" brand, laced with stainless spokes and a SRAM 8 speed cassette. I was very impressed by this wheel set. The hubs are very smooth — similar to my Velocity hubs on Thracian wheel set! The wheels have stayed true, and run FAST. To me they are a highlight that would easily go unnoticed.

## COMFORT

Always the "the seat" question. Seat comfort varies by the preference of the rider. This is only one of two hard shell seats that have been comfortable for me (the other was the Turner T-Lite). I have not tried the Swanson which I hear also fits American size rear ends well.

ActionBent seats have slotted openings in the center of the seat back to help facilitate more air flow. The downside might be that a little more debris from wet roads can come in. The seat has a very nice wide section at the base with a little curled-up lip on it which keeps you from sliding forward. It's nicely padded for comfort, but the cover is perma-



*Jim Hall's Actionbent Jet Stream. Note the USS bar/seat clearance.*

nent; thus you can not easily change the pad, or if you rip the cover you have to either get a new set up or have it reupholstered.

The seat recline is somewhat limited, offering a 3" quick release recline adjustment. The seat securely attaches to the main boom with an efficient pin mechanism.

The leg length is adjusted by a sliding boom, which should comfortably fit a 38" to 46" x-seam measurement. The boom can be cut shorter, as it comes fairly long, which is nice.

## RIDE

The Jet Stream's ride is very similar to the stability and ride of a Vision R40. The weight distribution is almost exactly the same. The bike climbs on a par with a V-Rex, and is about as fast — even with the Jet Stream's USS set up (which is unusual). The hard shell seat, very comfortable, enhances the bike's ability to accelerate and climb well. There is no front wheel flop, pedal steer or twitchiness in the handling.

The seat height of the bike is approximately 3" below the bottom bracket height, which further enhances the bike's efficiency. It sports a reasonable 41" wheelbase, which is shorter than some modern SWBs, but on a par with other direct USS SWB models.

## OWNING

**Utility:** The ActionBents are excellent and affordable recumbents that will work for just about any use.

**Options & Accessories:** ActionBent offers a bar-end plug mount rearview mirror (\$15); kickstand that clamps to the chainstay (\$15.95); an accessory light/computer mount that fits on the derailleur post (\$25); and a unique curved tube rear rack with spring-

loaded top hold-down and standard side-mounts for luggage bags (\$36). As with the bikes, the accessories are occasionally on sale. ActionBent aluminum shell seats are also available separately (\$125). Fenders should fit, but are not offered as an option.

## MARKET

The Jet Stream prices varies from a low of \$595 (July 2004) to \$715 (Spring 2004). Shipping and set up can add \$100-\$150 and there may be sales tax. If you don't like this price, ActionBents can be found on eBay as well, and are often on sale as they were the week we prepared this review.

There aren't many recumbents in this price range, especially those that weigh around 30 pounds. The HP Velo Wavey and Lightning T-Bolt are the only that I know of. Other contenders are the Cycle Genius models (actually CLWB) and the upcoming Sun Speedster SWB. From my experience, the Jet Stream is on par with most \$1200 recumbents such as the RANS Rocket and Burley Hepcat and the former Vision R40.

ActionBent has just introduced a Jet Stream-2 which has wide inverted style cruiser USS bars that attach to the fork (instead of a stem at the head tube). Another model, the Tidal Wave, has a Cromoly frame, 700c/451 mm 20" wheels and 27-speeds. The newest model is the Road Runner which has a curved frame, lower seat (19"), a full Cromoly frame and a monoblade fork and front disc brake. Check the website for current prices.

## MAIL ORDER

With any mail-order there are some tradeoffs. You won't get the support of a local



Tidal Wave with fork mounted USS

selling dealer. ActionBent bikes are shipped UPS and set-up may be an issue for some. If you aren't a wrench yourself, get the bike assembled or at least checked out by a qualified bike shop mechanic. Set up should run \$40-\$60, according to ActionBent. ActionBent does have a support section on its website with SRAM and Shimano tech downloads.

ActionBent offers a 30-day return policy.

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# Trice

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Should you decide to send your bike back, there is a 10% restocking charge, and you'll have to pay return shipping (approximately \$50-\$80).

There is an active "ActionBent" owners group at Yahoo.

### VERDICT

If you prefer USS, the new Jet Stream 2 is probably the better choice as it solves the limited turning arc problem on the original model. The Jet Stream is an excellent commuter and sport tourer for new enthusiasts. In saying this, I wouldn't hesitate to do a tour on it, as it has full rear rack braze-on, though it does only have one water bottle cage mount. In summary, I would highly recommend this bike and ActionBent. ActionBent recumbents truly live up to their mission of "absolute value." I'm really impressed with this bike.

**About the author:** Jim Hall has been riding recumbents since the late 1980s and has owned 65+ different recumbents and counting. He was doing lots of centuries and long distance 24-hour type rides in the 1980s on upright road bikes. He bought his first recumbent, an Infinity, in the mid-80s, then graduated to a RANS Stratus. Jim met Gene Lemle, a builder of deluxe LWB USS recumbents and fell in love with the full mesh seat and unique design. He rode his dual 20" 451 mm wheeled bike longer than any other — over 5 years. He came across a square tube RANS Rocket and has been hooked on SWB recumbents ever since. Jim recently sold his ActionBent Jet Stream and now rides a Volae Century.

### OWNER COMMENTS

"Upon delivery, I found several small parts and cables were missing or floating inside the box. It was a miracle that more parts were not lost." (Several comments like this.)

"The instructions have several poorly reproduced images and there was no cable routing guide. The chain idlers are welded on about 10 degrees off the chain axis.

This may be contributing to some of the noise from the idlers. The frame has several minor abrasions in the paint."

"The ride is firm but not bone-jarring."

"Packaging could be improved. My bike had a couple of paint scratches where parts in the box rubbed on the frame. My bike was missing a couple of fasteners . . ."

"One complaint is that the seat is too reclined for me, even in its upwards most position."

"I have replaced my chain idlers with one Burley Idler wheel."

"The chain idlers are noisy. I replaced mine with one from Power-On Cycles and they are much quieter now."

"I've replaced my ActionBent's chain idler with a Burley idler. The chain routing is over and under the (x-path) idler. This set up is very quiet compared to stock."

"I have about 100 miles on the bike so far and like riding it, but it is twitchy"

"The seat is comfortable but transmits harsh bumps through to the rider."

"I would recommend this or other ActionBent recumbents."

"In general a great buy. I'm a very happy owner."

**Editor Comments:** While most of the customer feedback on ActionBents was fairly good, the gist seems to be that the buyers cut the company some slack because the bikes are such good values. The chain idler situation sounds like a mild design problem that many owners are correcting on their own. If Bacchetta or Easy Racers were to have such chain management/idler issues, customers wouldn't be so kind.

There were some other newbie-type issues associated with getting used to recumbents, difficulties learning to ride a laid-back SWB USS, and a suggestion that the bike needs a rearview mirror (recumbents require them).

Nearly every person who responded mentioned the poor packing. Several had trouble with the assembly instructions and getting their bikes adjusted and ready to ride. If you do not have experience in bike mechanics/set-up, you have no business doing it — take your bike to an experienced bicycle mechanic and don't risk your own safety.

While the ActionBent is not perfect, the majority of riders were happy with their ActionBents and the high value of the bike. If you're willing to work out the bugs, you can save some money and ride a cool recumbent bicycle.

The ActionBent auction style pricing is a bit odd. The prices changed at least twice while this review was in process, and we're told new bikes are also sold on eBay.

Our experiences with ActionBent were not satisfactory. We had no luck getting a test loaner or negotiating a test bike to purchase. Several emails to the company were ignored. We received a response explaining why the emails were not getting answered, but none of our questions were ever addressed. Our email to China Mascot was also not answered. We also tried to get better photos for the article to no avail. Perhaps ActionBent's poor service is limited only to the media. Go figure. ♦



# BACCHETTA

Rider: John Schlitter  
Age: 47  
Bike: Bacchetta Aero  
Event: 2004 Bike Across Florida  
Distance: 167 miles  
Finish: First, 6:34:10 (course record)

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# 5,000 Mile Road Test Bacchetta Giro

By Mark Libner  
NS9N@comcast.net

Looking back at the first 5,600 miles on my Bacchetta Giro, my choice for a first recumbent has been a good one. A converted roadie, I desperately needed to do something to reduce butt pain. I tried everything to make that upright less painful to ride. Then, along came a local bike show and the new guys on the block, Bacchetta. My first test ride on a recumbent at the show was... well – let's not discuss my gracefulness. But my butt didn't hurt and I was sold on a recumbent. The hunt was on. I was off to try every recumbent I could find. After many weeks and many rides, I choose the Giro. Of course, I was in the "early adopter's club" and was lucky to get on the waiting list for the first shipment into the country.

Six weeks later, it was time to hit the trails. The first 200 miles were exciting and there was more of a learning curve than I expected. However, once I learned to relax I was on my way. It was about that time that the "early adopter's club" showed its negative side. The idler pulley completely deteriorated. Bacchetta was quick to send a replacement and I was back on the road again. About 200 miles later, disaster struck. While shifting to a lower gear for a hill climb, the chain caught in the derailleur and drove the derailleur into the rear wheel.

Needless to say, it was replacement bike time. Again, the team at Bacchetta responded with unbelievable speed. Not understanding

exactly what caused the failure, the bike shop and I spent extra time going over the new bike. Almost ready to ride out the door, we found the problem. Somehow, the chain was linked with the wrong size pins — too long. A quick check of the old chain showed exactly the same thing. An easy fix, but one lesson learned when checking out a new bike. We never did find where the wrong pins were installed but now I felt confident I had a solid bike.

So, what is this bike all about? Some call it the best bike of the year, others I believe call it unremarkable. Well, both may be right.

Is the seat the most comfortable on the market? For me, yes. I have not found anything that comes close. However, I do have friends that are more comfortable on other bikes. I think the answer on the seat is really very easy. If it fits you, you will have no riding discomfort and you will want to ride more. If not, it's not the right choice for you. Only you can determine which category you're in. After over 5,000 miles, the foam is starting to deteriorate and the cover is showing minor tearing. I am not sure what the life expectancy should be, but I think it will get replaced over the winter. The mesh on the seat back is perfect and looks like it will be good for at least 15,000 miles or more.

I replaced the original tires with Schwalbe Mathathons when I purchased the Giro and for sure, at 6,000 miles, they will need to be re-



placed. But I am not complaining here. These are great tires for the price and I will be replacing them with the same. I do have to admit that both tires have "Slime" belts in them and since I have done this, I have not had a flat tire in over 4,000 miles. (Find some wood to knock now!)

Except for the mishaps with the chain and the idler pulley, the components Bacchetta selected for the Giro have performed flawlessly. Actually, I have to commend Bacchetta on its choices. Yes, we all know price dictates just about everything these days but with normal cleaning and one quick "tune-up" this bike has been a maintenance dream. I cannot say the same for other brands my friends ride but that is for them to tell. I did replace the chain at 4,000 miles because it was time. In reality, the chain should be changed every 3,000 miles.

Bacchetta's chain management is bit unique. There is one idler with a cross-over (X-path) at the idler pulley. However this cross-over produces an extremely quiet running chain and is far better than floppy chains or chain tubes. I love the simplicity of no chain guards; however, if you ride with baggy pants, you will get the chance to test which laundry detergent really does "get the grease out." Black sweat pants are a great choice if you must. One other word of caution: the power side of the chain must be routed under the idler closest to the bike frame. Damage to the idler mount will result if the chain is routed incorrectly.

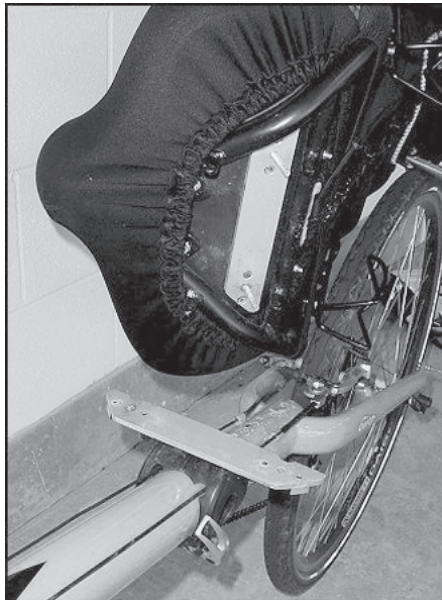
I am not sure what anyone really has to say about frames — if the welds are good and they hold and the geometry is right for the bike, what else is there to say? I do have a beef with the powder coating. I have not been easy on this bike, riding on many limestone and crushed gravel trails, often in the rain. The bottom side of the frame is a mess, a series of paint chips. None of the chipped areas have rusted, so I am grateful for that but it is not a pretty sight to see. (I know, it is the bottom of



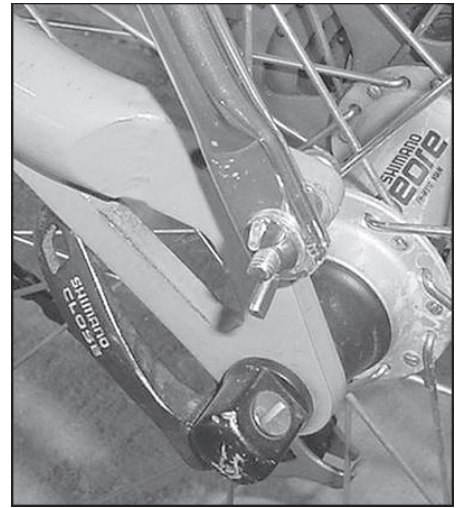
*Two large plastic wing nuts with metal inserts which I purchased at a local hardware store hold the seat to the new seat frame brace. No tools needed to remove or install the seat now.*



*This photo shows both the large plastic wing nuts under the seat and the smaller wing nuts to hold the rear seat brackets to the frame near the rear drop outs.*



*This Photo shows the two metal brackets which clamp together using 1/4" screws and large plastic wing nuts to hold the seat to the original seat mounting. All the original seat mounting parts were used, but are now separated by the two metal brackets. My choice of material for the brackets is 1/4 inch thick aluminum. It is light weight, does not rust, and very easy to drill, cut, and file to shape. After thousands of miles of use and hundreds of times on and off the bike, the brackets look like new.*



*A close up view of the rear seat brackets where they mount to the frame. I choose stainless steel for this hardware. The rust resistance has really paid off during our wet Chicago rides.*

the boom and who looks there anyway?)

For me, handling is where this bike shines. I find the handlebars to be the most comfortable in the industry. I believe they add to the bike's extremely neutral handling, and the ease of adjustment is world class. While other bikes may have quicker steering, feel lighter while riding, or maybe seem faster, I believe Bacchetta has hit dead center on developing the perfect total SWB OSS package. Bottom line, as far as I'm concerned, this bike is a dream to ride. Even after 100-mile rides, I feel tried but not sore in any way.

So what are the negatives? The chain idler is not the most robust on the market. It is very quiet but also soft, so it will wear out. Not a big issue but I always carry a spare. The new sprocket design from Greenspeed looks like a very interesting alternative.

The seat mounting to the main frame is very robust and will not move once locked into place. However, seat adjustment is not easy, as the collar does not move easily on the boom unless the boom is perfectly clean. I have fabricated my own quick release seat mounts us-

ing the stock parts and two 1/4" aluminum plates. Large plastic wing nuts now hold the two plates together, thus mounting the seat to the bike.

I have still not found a kickstand that works on this bike. I also had to do some engineering of my own to develop a quick release for the seat. Using the seat removal method recommended by Bacchetta will frustrate you and most likely end up with a cross-threaded mounting screw. Hey Bacchetta, you guys started in the accessory business — don't forget the finer points of a great ride.

Thinking of a SWB ride, don't pass up a

ride on a Giro. If it fits, I think you will like it. And in my case, it looks like a long-term winner.

Ride 'em fast, ride 'em hard, but always ride 'em safe — it is all about the miles. ♦

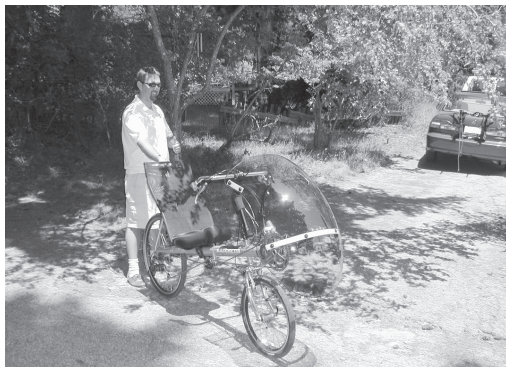


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Nanda Holz with his Bacchetta Giro and our tinted LC Flyer fairing. The LC Flyer fairing is 6" shorter than the Chopper fairing.



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*"I did a 45 mile morning ride and was able to get up to 43.7 mph on a downhill where before my best was 37-38 mph. I did the ride in 2 hours 25 minutes and averaged 18.2 mph which is another personal best....up from around 15-16 mph. These fairings are awesome!!!"*

— Nanda Holz

# Sidebar — Sportworks Bike Rack

By Mark Libner

If you've seen bike racks on the front of buses and thought you'd like a similar rack for the back of your car, check out the Quick-load Bike Rack from Sportworks. For the recumbent rider on the go, Sportworks has what may be the best rack on the market.

## For

1. The rack is extremely well designed, is manufactured using high quality robust materials and can be moved from vehicle to vehicle without modifications.
2. You can get a fully assembled bike on and off the rack in less than 15 seconds without breaking a sweat — and without lifting the bike over your head.
3. The rack holds a bike securely with the seat facing the right way for minimal wind resistance while driving.
4. All surfaces that come into contact with the bike are well protected with insulating foam. The only contact points are on the bike tires.
5. The available tilt mount allows easy access to the vehicle's trunk or hatch.

## Against

1. The rack is one of the most expensive racks on the market, but shop around because the price can vary by as much as \$40 from store to store.
2. You will need a receiver trailer hitch — an extra \$150 or so if you don't already have one on the vehicle.
3. There is some side-to-side rocking in the assembly, especially if you use the tilt mount. The 2" hitch version is more secure but the 1.25" is really not that bad. Sportworks now includes a hitch mounting screw, which really helps.
4. Depending on your vehicle's hitch, the rack may extend off the bumper by an extra 8". This is not bad by itself, but the bikes hang way out there. You have to be cautious when backing up.



5. You must remove the rack to run the vehicle through a car wash. This operation typically takes less than three minutes.

Because I can never leave anything alone, I must admit that I modified my rack. I'm sure Sportworks would not appreciate it, but I shortened the length of the horizontal mount by 6". Yes, I cut the mount and redrilled some holes because I wanted the bike as close to the back of the car as I could get it. I don't recommend that you do this at home unless you have a full machine shop at your disposal. This is one modification that Sportworks could make to improve the design. Ideally different lengths of extension tubes could be offered so the user could customize the rack for different vehicles. However, as shipped, the mount should fit most vehicles.

All in all, this is one sweet bike rack and I highly recommend it for those who want speed and elegance when racking a bike and don't mind paying a bit more for it.

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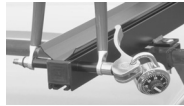
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28" 23-622, 25-622, 28-622,

BIG APPLE:



16" 50-305,  
20" 50-406, 60-406,  
24" 50-507, 47-507,  
26" 50-559, 60-559,  
28" 50-622, 60-622,

MARATHON PLUS:



20" 47-406,  
26" 47-559, 37-590,  
28" 28-622, 32-622, 37-622,  
40-622, 47-622, 40-635,

MARATHON SLICK:



20" 35-406,  
26" 35-559, 47-559,  
28" 30-622, 37-622,

MARATHON:



16" 40-305, 47-305, 37-349,  
18" 40-355,  
20" 40-406, 47-406,  
24" 40-507, 47-507,  
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# Outfitting Your Home Recumbent Shop

## (Or Tools You Need To Buy)

By Bob Bryant

Even in this day of mainstream recumbency (well, sort of), it's very important to understand how to work on your bike and to have a place to work on it — even if it's just so that you can keep the bike clean or install some new tires.

I know so many of you will scoff at this plan, but this is knowledge that you need. You just never know when you'll have to do some roadside repair. Bicycles are essentially very simple machines, and the art of working on them can be a wonderful thing.

In this article, we'll try to help you set up a recumbent shop in your spare room or garage so that you can experience zen and the art of recumbent maintenance, or just have a place to work on your recumbent.

### Bike Stand

The first thing you need is to find a way to prop your bike so that you can work on it. This sounds easy, but since recumbents come in all shapes and sizes, it can be more difficult than it sounds.

Your first step is to contact your dealer or manufacturer to see if they have a repair stand adapter. Most don't have them, but Burley offers one. Monotube and fat tube recumbents are the most difficult to place into stands. Most bicycle stands are made to adapt to standard bicycle seat-tubes — or use a seat-tube adapter.

Most stands are designed to hold bikes that weigh 50 or 60 pounds and are of standard length. For long wheelbase (LWB) or tandems, a very stable stand is required. We have a pair of Black & Decker Workmate stands (fancy saw horses with clamps) that we use in our shop sometimes in combination with a Topeak Tune Up DX rear wheel holder/stand. This is a really cool stand, but ours broke after 2 weeks when a 40+ pound recumbent fell off of the stand. This stand is best used for lighter bikes. I'll probably buy another one and fasten it down better (and not use it for 50 pound bikes).

Trikes can also be difficult (forget about a typical repair stand). Your best bet might be a trainer on a table. Perhaps trike fans will write us with tips on how they do it.

Park tools makes a line of affordable stands (PCS-series) starting from \$100. Some Park models have jaws that open up to just 1-5/8" and others open to 3" (PCS-9 and PRS-15). Park is the most well known of the bicycle tool companies, but there are others as well.

- Park Tools/Repair stands  
[www.parktool.com](http://www.parktool.com)

- Pedro's  
[www.pedros.com](http://www.pedros.com)

Flipping your bike upside-down like you did when you were a kid is not a good option. Also, don't try suspending your bike with ropes from the ceiling or anything like that.

I use a Topeak Prepstand Pro (\$249.99). It accepts up to a 1.75" frame tube (clamp) and has a unique digital scale for weighing bikes and parts. So far, this is the best stand I've used. The scale is very accurate and way cool.

- Topeak Prepstand  
[www.topeak.com](http://www.topeak.com)

- Ultimate Bike Support Stand  
[www.ussbike.com](http://www.ussbike.com)

Angletech's Kelvin Clark offers a version of the Ultimate Bike Support Stand that fits big tubes like the Bacchetta Aero and the like.

- [www.angletechcycles.com](http://www.angletechcycles.com)  
Email: [angletech@att.net](mailto:angletech@att.net)

### I. Tools To Buy: Basic

Bicycle tools need to be separated into several different groups: I Basic; II Tune-Up; III Wheels; IV Frame builds; V Tools You May Already Have; VI; the final group is probably the most important — those to carry on your bike.

The final section is your bike parts cache.

- Floor pump with gauge
- Tire patch kit
- Hex wrenches to fit all parts on your bike (I like the "T" handle type with holder) (I have 2, 2.5, 3, 4, 5, 6, 8 and 10mm)
- Open-ended wrenches (7, 8, 9, 10, 13, 14, 15 and 17mm)
- 15mm pedal wrench (long; buy a good one)
- Headset wrenches (You won't need these if you have a threadless headset)
- Chain tool
- Spoke wrench
- Shop Apron
- Brush kit (Pedros makes a 5-brush kit)
- Chain scrubber (a clean chain will keep

- your drivetrain clean and last longer)
- Grease (bicycle-specific, like Phil Wood)
- Grease (silicone for suspension forks or grip shifter lube)
- Oil (Phil Wood Tenacious)
- Baby powder (coating tubes & tire inner casings)
- Rubbing alcohol (for bar grip removal)
- Chain lube
- Rags
- Hand cleaner

### II. Tools To Buy: Tune Up

These are tools for more advanced repairs and tuning up your own bike:

- Shimano cable cutter (keeps cables from fraying)
- Crank wrench (long 14mm)
- Crank puller (I've needed these for road side repairs)
- Bottom bracket tool (for your brand)
- Cassette removal tool
- Chain whip (holds cassette while you remove lock ring)
- Chain elongation indicator (checks chain wear)
- Torque wrench (tightens parts correctly)
- Snap-ring pliers
- Parts washer

Park offers a 57-piece Professional Tool Kit that sells for around \$790 and a 32-piece Advanced Mechanic Tool Kit for around \$275. Pedro's has a Master Tool Kit 2.0 for around \$650.

### III. Tools To Buy: Wheels

Wheel maintenance and building is a real art. I must admit to not having learned this, but I've always wanted to. It's the last part of bike maintenance that I rely on others to do.

- Wheel dishing tool
- Spoke tension gauge
- Truing stand (don't buy a cheapie)

### IV. Tools To Buy: Frame Build

- Metric taps
- Headset press (install headsets)
- Headset cup removal
- Fork crown race punch
- Cassette and bottom bracket tools.

### V. Tools You May Already Have

- Needle-nosed pliers
- Pliers (medium size)
- RoboGrip Pliers (Craftsman, cool!)
- 6" Adjustable wrench
- Philips & standard screwdrivers (Be sure to get a small size to fit your derailleur adjusting screws)
- Ball-peen hammer

- Rubber mallet
- Metric sockets
- Razor blade knife
- Hacksaw
- Files
- Vise

## VI. What To Carry On Your Bike

You should also put together a tool kit to carry with you on your bike. My favorite is the Park Wallet Tool Kit. What you carry should depend on how reliable your bike is.

- Tire boot (emergency tire repairs)
- Spare tubes (one of each tire size)
- Patch kit
- Screwdriver (small or combo tool)
- Allen wrenches or combo tool
- Tire levers
- Tire pump (compact size)
- Spare chain links/quick link
- Spoke wrench

For tours or longer day rides, you may want to add the following:

- ID
- Cash
- Grease
- Chain lube
- Spare spoke/kevlar spoke
- Compact headset/pedal tool
- Rain gear (if it rains in your area)
- Any vital parts from your "cache" below

The closer you stay to home, the less you need to carry. Over the years I've become stranded several times when I was unprepared. Once a test bike's idler was sawed in half (you wonder why I recommend carrying an extra idler?). I didn't have a spare — do you? The bike had two idlers, so I removed the good one and placed it in a crucial position and limped home. I've had cranks or pedals come loose on three separate occasions. I've just started carrying parts to handle these problems.

## VII. Spare Parts Cache

I've always suggested that recumbent owners keep a cache of parts specific to their recumbent just in case — especially if you love your bike and plan to keep it. As BikeE and Vision owners found out, you just never know when parts will become unavailable or highly sought after (BikeE & Vision are out of business). Items we suggest you keep spares of:

- Front & rear replacement tires & tubes
- Proprietary mid-drive parts
- Hose-clamp (for seat mount, etc.)
- Idler (one of each) or chain tube (mounting nut & bolt)
- Seat foam & cover
- Seat mesh
- Replacement chain

- Extra drivetrain parts (rear derailleur, chain rings & cassette)
- Suspension shock or suspension fork rebuild kit or fork elastomers
- Extra cables

You just never know. With this past season's components shortage, some parts were just not available.

There is something to be said for the use of standard parts (vs. custom proprietary parts).

## Where To Buy Tools

Your local bike shop can order many tools for you. You can see tools, stands, etc. in catalogs such as:

- Hostel Shoppe  
www.hostelshoppe.com
- Bike Nashbar  
www.bikenashbar.com
- Performance  
www.performancebike.com
- Colorado Cyclist  
www.coloradocyclist.com

As for mainstream tools, I like Sears Craftsman, just as I prefer Park for bicycle-specific tools (see URL on page 22)..

## Reference

The best place to start is with a few good books on bicycle maintenance. Here is a list of my favorites:

- *Bicycling Magazine's Complete Guide to Bicycle Maintenance and Repair* by Jim Langley (approx. \$20)
- *Zinn & The Art of Mountain or Road Bike Maintenance* by Leonard Zinn (approx. \$18 each)
- *Barnett's Manual 5th Edition* by John Barnett (professional guide, approx. \$120 list, \$85 at Amazon.com)
- *The Art of Wheel Building* by Gerd Schraner (approx. \$22; Colorado Cyclist)
- *The Bicycle Wheel* by Jobst Brandt (recently out of print, but used copies might be available).
- *Break It, Fix It, Ride It*, an interactive repair cd-rom (\$30 at the Hostel Shoppe)

Two more books I must mention are *Richard's 21st-Century Bicycle Book*, by Richard Ballentine. While not exactly a repair guide, it offers insight into the wonderful world

of bicycling. And also Sam Tracy's often irreverent *How To Rock And Roll: A City Rider's Repair Manual*. I love this book.

My first book was the *Bicycling Magazine's Guide*, way back in 1986. I don't have this anymore, as it finally just fell apart from being used so much. Many pages were greasy and well worn.

That was the year I took delivery of my first recumbent. I knew I was on my own, so I bought some tools, a repair stand and the book in order to set up my recumbent. These skills are really within your reach. I highly recommend learning how to repair your own bike.

## School

In many cities bicycle maintenance classes are offered. If you are more serious, there are two professional bicycle mechanic schools that you might consider attending:

- United Bicycle Institute  
Tel. 541-488-1121  
Web: www.bikeschool.com
- Barnett Bicycle Institute  
Tel. 719-632-5173  
Web: www.bb institute.com

## Closing

Your adventure into bicycle maintenance is likely to change your views on many aspects of cycling. For me, it's made me appreciate high-quality components that are made to last. I also appreciate simplicity in bicycles and I'm less willing to try out some new fangled high-tech parts that are unproven — at least on my own bike.

We plan to cover more topics such as this. Watch for an upcoming primer on recumbent components — complete with my personal biases gathered over my 15 years of being a recumbent bicycle critic.

I hope this article has been helpful, and I wish you all luck with setting up your own home repair kits — however small or large they may be. ♦

*A special thank you to Park Tools (excellent website even lists parts numbers), Leonard Zinn (his books), Jim Langley (his book) for the references used in this article.*

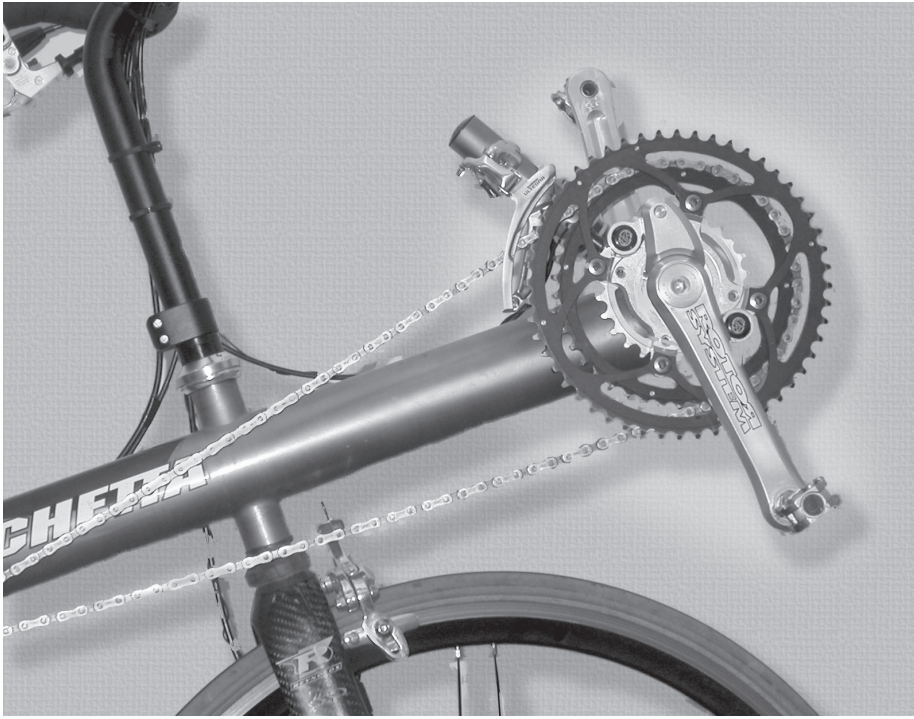
*If you have any tips, tricks or find any deletions from these lists, please drop us an email and let us know so we can keep this article updated.*

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*"Rotocito" — as the Rotor Systems cranks are affectionately called in Spain — on a Bacchetta Aero.*

# Review: Rotor Cranks

**By Matt Schneps**

Once in a long while an innovation comes along that is so simple and yet so effective that it effectively revolutionizes a sport: The Prince racket for tennis, the Nike shoe for running. Though you really need a crystal ball to know which innovations will last, I have a gut feeling that the Rotor cranks might just be one of those great innovations that will change the face of cycling. I found that almost everything I've heard and read — the rumors of speed gain, better hill climbing, and relief from knee pain — seem

to be true. In fact, now that I've ridden with Rotors it's hard to imagine ever wanting to ride without them. The Rotor crank system is quite simply an extraordinary, revolutionary innovation in bicycle design.

## Riding Fast

**Let's face it. I love to ride fast.**

I love it most when I'm at the top of a hill and a roadie zips up next to me, all decked out in race gear, complete with a disc wheel and aero bars. The strongest riders are always

friendly and polite — giving me a smile or a nod as they prepare for the descent. I love it when they hunker down into their most aerodynamic crunch, just before letting loose at full power down the hill. But what I love most about these scenes is the look of surprise on their faces as I pass 'em three-quarters of the way down the hill on my 'bent. Usually, I stop pedaling and coast as I pass — just for effect. If they catch up later, the real pros are always good sports about having been bested, saying something like "Quite a machine you've got there." I drink in these compliments like a stream of cool water.

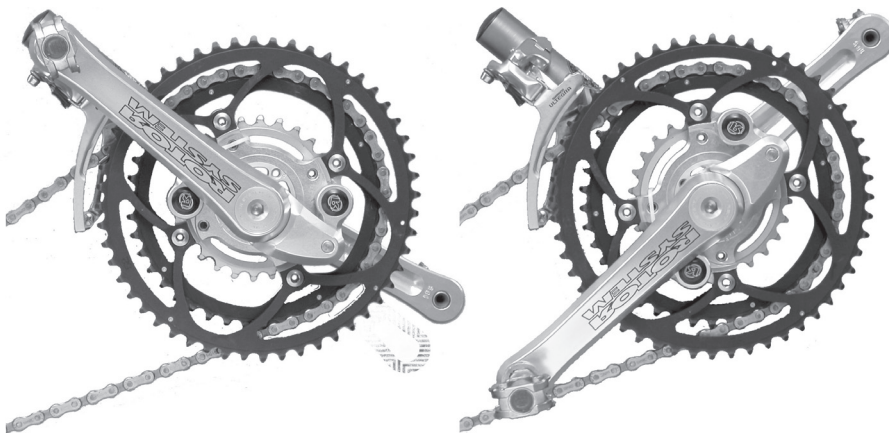
I first got into 'bents because I thought they seemed cool and interesting, and later because my body couldn't tolerate the punishing positions uprights dish out. But now that there is a whole new generation of fast road recumbents to choose from — bikes like the Bacchetta Aero — I'm into 'bents for the speed. Rotor cranks only add to the mystique.

## Getting Lost With Rich Pinto

The first time I laid eyes on a set of Rotor cranks was during a century ride when I met Rich Pinto, designer of the Bacchetta Aero. His Aero looked pretty much exactly like mine, except he had this neat looking crank set with the word "ROTOR SYSTEM" etched in big type along the crank. These cranks looked cool, but they also struck me as a bit more than standard Aero machinery. An alarm bell went off in my head: Why would Rich, who went to such great trouble to design and build one of the lightest titanium/carbon 'bents made, put something on his bike that actually made it heavier? I got my answer minutes later as Rich rocketed off. I never saw his back tire again until I got to the parking lot at the end of the century.

## Rotor System Cranks

The modern bicycle, both upright and 'bent,



*'Bent Cranks for 'bents. As you pedal the alignment of the Rotor's crank arms continuously go from bent (left) to straight (right) to bent again.*



*One Leg Helps the Other — With the top leg pressed against the "dead spot," the bottom leg is still free to push and turn the cranks — a "power assist" that keeps the cranks powered and spinning through the entire cycle.*



is a truly remarkable machine. The bicycle adds only about 10% to a rider's weight. Yet it provides a mechanical advantage that lets you range over distances many times greater than you could do on foot, at speeds roughly two to three times faster than the fastest speeds humans typically muster. The modern bike is such a highly optimized machine that nearly every source of friction and loss has been designed out of it. Off hand, you might think there's really not much left to improve, but clearly that's not true. There are still big losses in the drivetrain, in tire friction, and — of course — in aerodynamics. These chinks in the armor leave lots of room for clever designers to find practical ways to squeeze greater performance out of a bike.

The chink in the armor Rotor strikes at is the mismatch between the body and the cranks: the conversion of the natural piston-like up-and-down motion of the legs to the round-and-round motion required by the bike. Engine designers solved a similar problem ages ago by figuring out how to convert the linear motion of the pistons to the circular motion of the drive shaft, using a crankshaft, cams, and other linkages. But up to now cyclists have had to do this conversion themselves, using the small muscles in their ankles, knees, and other joints to try to pedal smoothly in a circular motion; a process that is not only inefficient, but stressful on the body. The Rotor System solves this linkage problem in an ingenious way, and the result is a system that improves the efficiency of your pedaling while reducing the stress on your joints.

### How They Work

The Rotors improve the efficiency of cycling in two ways. First, they effectively eliminate the "dead spot" in the cycle (the point in the cycle where no matter how hard you push down against the pedals, the cranks cannot turn). Second, they help by "gearing down" as you pedal through the dead spot, giving you a mechanical advantage in the part of the stroke in which you need it most.

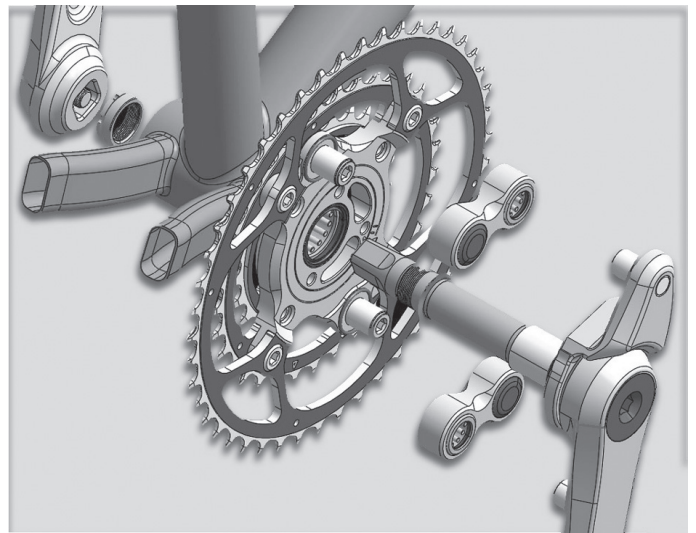
With traditional cranks, both arms of the cranks are always fixed in a line. So, when one leg gets stuck in the dead spot (at 12 'o clock on an upright), the other one is stuck there too (at 6 'o clock). But the Rotors do an ingenious thing. While the two cranks are in line at the most powerful part of the stroke, they go slightly out of line once every cycle as your foot approaches the dead spot. And with the cranks no longer in a line, even when one foot is locked in the "dead" position, the other foot is still able to push. The net result is that one foot helps push the other through the dead spot, as if there's a "power assist" to keep you from getting stuck. This means you're whipping through the dead spot at a much faster rate — it's as if you are going into a lower gear as your foot nears the dead spot.

The feeling is uncanny, and you have to try it to really get a sense of the difference. The long and the short of it is that between the "power assist" from the other leg, and the fact that you spend less time in the dead spot, your cadence goes up, and you just don't waste as much muscle pushing against a dead crank. And so your power soars!

### Reducing Knee Pain

An unexpected and welcome benefit of the Rotors is that while they increase your power they also reduce the stresses on your joints. You can easily see how Rotors might help reduce knee pain by doing a little test for yourself: Try rocking your cranks back and forth a few degrees around the dead spot — applying a bit of pressure as you do (don't overdo!) — and you'll feel some very unpleasant sensations in the knee that is bent. The more you press down into the dead spot the more you'll feel your patella lift up, straining and damaging the small muscles and tendons in the knee.

The Rotors prevent this damage by whipping your knees through the dead spot while at same time reducing the forces you need to get out of this potentially painful position. When you realize that your knees go through the dead spot roughly 10,000 times every hour you ride, you can see how the Rotors might save your knees. So in the end, your joints feel better and you get more power, too!



*Simple Design — Built around a cam, there are few moving parts to wear. Routine maintenance only calls for a drop of oil here and there, whenever the chain is lubed. (Adapted from drawing courtesy Rotor Systems.)*

### First Ride Out

For my first ride with the Rotors, I went out for 25 miles on an easy route that included some gentle grades. It took me only about 15 minutes to get used to the different feel, but at first I didn't really notice much change in performance. After riding some more I figured out that my old pedaling habits, designed and practiced to help me get through the dead spot, were all wrong for the Rotors.

Normally when I ride, I'm silently chanting a mantra "steady circles... steady circles" to help me pull my legs through the dead spot (a motion some people describe as wiping your feet on a mat). Well, ten miles out I figured out that this was exactly the wrong thing to do when riding with Rotors. The Rotors' "power assist" pulls your legs through the dead spot for you. It's automatic. So you can forget about wiping your feet on the mat, forget about your mantras, forget about the dead spot, and just let the Rotors do all the heavy lifting. All you have to do is to mash down as hard as you can using the biggest muscles you have in your legs. Once I figured this out, my legs started firing up and down like they were pistons in a car engine. My cadence went up and I felt my power rocket through the roof! This was cool!

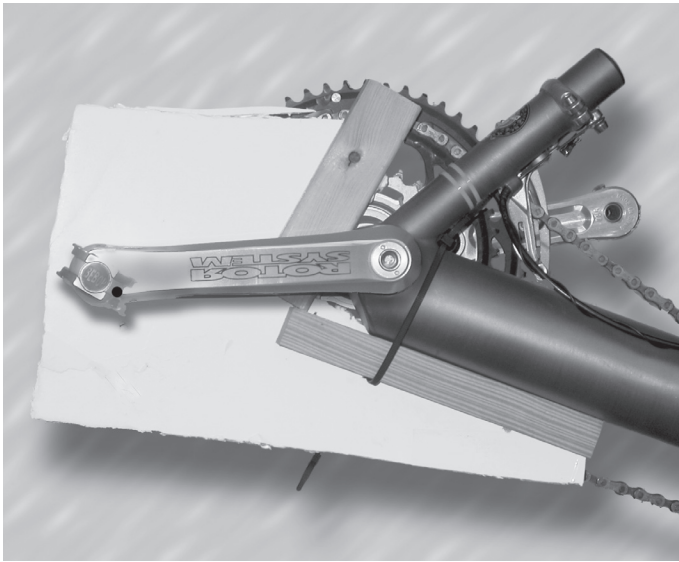
The rest of my maiden ride was spectacular. At times I was cruising so fast and effortlessly I actually had to double check whether I had wind at my back! (I didn't.) I have been riding this route for years and just couldn't believe the speeds I was seeing overall. I was hitting personal bests for this route on my first time out.

On the small hill I normally climb huffing and puffing at 16 mph, I was now over 20 mph. And I wasn't even sucking wind the way I normally would at this point. By the time I neared the end of my first ride I felt like Superman. If any roadies had come along and tried to pass me at that moment I would have pulverized them.

The action of the cranks is smooth, and there's no discernible play in the cranks. In fact, when you're pedaling in true Rotor form, you feel like you're putting power to the cranks almost continuously. The motion feels smooth and tight, like the feeling I used to experience riding a fixed-gear track bike, a feeling I never thought I'd experience riding a 'bent.

### How Much Speed Will I Gain?

Rotor cranks are relatively new, and are only just now catching hold with the fast racing crowd that makes a science of performance measurement. But reports from time trials and other competitions are now beginning to come in, and word on the street is that riders are seeing improvements in their speeds amounting to about two minutes over an



*A handy Jig for accurately marking the position of the dead spot — made from scraps of wood stapled to a piece of cardboard cut to fit the frame.*

hour's run. Two minutes in an hour. Sounds like nothing, right? But you have to understand that these reports are coming from riders who ride at an average speed of 25 mph just to get in the club.

If you go to [www.analyticcycling.com](http://www.analyticcycling.com) and take a look at what these numbers mean in terms of power, you will learn that these athletes are reporting a roughly 10% increase in power using Rotor cranks. That's huge! It's comparable to the difference you might expect from trading in your knobby tires for slicks, or adding a fairing. Getting another 10% in performance is a spectacular improvement.

### **500+ Miles later**

After over 500 miles on the Rotor System cranks, the biggest difference I noticed was in pushing the tough hills. My regular ride includes one hill that has always been my nemesis. This hill is so bad, it's all I can do not to give up and walk. I used to grit my teeth and crawl up at 4 mph riding my lowest gear. And when I finally made it to the top I would be gasping and wheezing so badly that I would have to take a look around to make sure nobody thought I was having a heart attack! With the Rotors I climb this same hill at nearly twice the speed (two gears higher up). I'm not sucking wind — and I am able to recover quickly and speed on my way.

I also found a big improvement when sprinting against a rider at top cadence. I found that the less I thought about pedaling, and the more I went by instinct, the faster I could go. The Rotors whip you through the dead spot so quickly that at high cadence your legs are reset to the "push" position before you have time to do anything else but push again. I just let the Rotors take my cadence way up, focus on letting the big muscles fire like pistons, and watch my speed climb. Overall, my riding cadence has gone up at least 10%, and with it my speed.

Without question, my knees feel better on the Rotors, especially when you consider how much more I've been pushing myself. I normally experience some pain at about 45 or 50 miles, and now I hardly feel any pain at all.

### **Average Joes & Average Janes?**

So what do Rotors mean for the average Joes like me who don't race time trials? Before I tried Rotors I thought they would not be worthwhile for an "average" rider, and that here's some more fancy expensive gear that gives the high-end competition the few milliseconds advantage they need to win. But, now that I've tried them my thinking has changed completely. I now think that the "average" enthusiast prob-

ably has much more to gain from Rotors than the highly trained pros.

It's a bit like the invention of ABS brakes for cars. For years, drivers were taught to practice pumping the brakes to help bring the car to a controlled stop in wet or icy weather. And then along came ABS brakes and nearly all drivers, whether "average" or pro, are able to bring a car to a controlled stop. But they have to learn to apply steady pressure instead of pumping the brakes. In much the same way, pro riders have been trained for years to pedal smoothly through the dead spot, and to keep the power levels high through all parts of the cycle. And now along come the Rotors, and even the average rider can cycle like a pro by just doing what comes naturally. Sure, the pro might gain some from the Rotors, but the "average" rider is likely to benefit even more. ABS is just a better idea, and Rotors are just a better idea.

### **Is It Worth The Weight?**

The Rotor crank replaces the standard crankset and bottom bracket and adds roughly a pound to the overall weight of your bike. Those of us who invested thousands of dollars to shave ounces off our 22-pound titanium or carbon bikes might shudder at the thought of adding a whole pound to the bike. After all, everyone knows that lighter bikes climbs better, right? Well, not exactly!

If weight was all that mattered in climbing hills you'd see Lance Armstrong ditching pounds off his bike by getting rid of the derailleur, crank set, and cogs and bolting up the Pyrenees on a fixed gear track bike.. Sure the bike would be better if the transmission didn't add any weight, but you don't see many people who prefer climbing hills on a fixed-gear bike. The extra pounds are worthwhile because they are functional weight, weight that helps more than hurts in climbing hills.

The Rotor crank, like the drivetrain, is functional weight that helps you climb hills. To push that extra pound up a 6% slope, your body has to put out one or two watts of extra power, just a small fraction (hardly even a percent) of the 150 to 600 watts riders typically exert climbing a hill. Compare that fraction of a percent cost to the 10% gain in power from the Rotor, and the bottom line is that Rotor cranks are more than worth their weight.

### **Installing the Rotors**

You can get your Rotors via mail directly from RotorUSA, or from any bike shop. If you're not a do-it-yourself type and would like a bike shop to install the Rotors, contact [howie@rotorbike.com](mailto:howie@rotorbike.com) to locate an experienced dealer in your area. Choosing a shop to install the Rotors is a bit like choosing a doctor for heart surgery: pick one that's done it before and you'll be better off. Any good bike shop can order Rotors directly at attractive dealer prices, and can install the cranks for you. Rotor is so confident you're going to be happy with the results that they make it easy for you to try the Rotors risk-free: there's a 30-day, no questions asked, money-back guarantee.

I ordered my Rotors from RotorUSA direct. They come in a variety of crank lengths, and I ordered a 'bent-friendly 165 mm. They came quickly, and beautifully packed. It took me about an hour to install the cranks. Rotor's installation directions were clear and easy to follow. Even though the installation is a bit involved, it's not something that's especially hard. You just have to follow the directions very carefully.

The trickiest part of installing Rotors on a bent is finding a way to mark the dead spot, a position that varies on a 'bent from bike-to-bike, and rider-to-rider. Though the Rotor's instructions provide a good technique for fitting a 'bent, I found it easier to make myself a little jig out of a piece of cardboard, and use this to reliably mark the crank angle corresponding to the dead spot. The dead spot is easy enough to find spinning backwards on the bike, and once you find it, a friend can tape the outer chain ring to the front derailleur cage so you can hop off the bike and mark the corresponding crank position on the cardboard jig. I then followed the standard installation instructions, and an hour later I was ready to ride!

## Dialing-In a Choice of Muscles

The Rotor has an adjustment called the "regulation point" that can be set when the cranks are installed. You measure the position of the regulation point with the aid of reference marks etched into the Rotor. This setting controls where you get the most leverage in the spin cycle.

The choice of regulation point makes a surprising difference in how the Rotors feel. It's almost as if this setting lets you dial in which muscle groups you prefer to use. When the regulation point was set toward the longer tick marks, I tended to use my calves more and pulled more on the cranks. The overall effect was that it was better for climbing hills. But this position also tended to make me spin out more easily, causing me to ride the bigger chain rings more.

Most riders will want to set the regulation point in the recommended middle position, or perhaps just a tad toward the longer marks.

## Chain rings

Rotor chain rings are custom made to fit around the large cam at the center of the crank. Rotor has rings available in sizes from an inner of 26 to an outer of 63 teeth. The rings are lightweight, well-machined, and beautifully anodized. The outer rings have pins and ramps to make for smooth shifting. Crank arms come in lengths from 165-180 mm.

## Another Gizmo to Break?

One of the most important questions for anyone getting ready to spend big bucks on some new gizmo is whether or not the thing is going to hold up over time. Indeed, Rotor cranks are more complicated than traditional cranks. In addition to the usual gears and bottom bracket bearings, there's now a cam and a couple of pivots to turn and wear.

The workmanship on the Rotor is top drawer. When I asked Howie Cohen of RotorUSA what sort of things seem to break on the Rotors, he made it seem like he's the Maytag repairman who just sits around playing solitaire all day: he said customers just aren't coming back with problems. Rotor

cranks come with a two-year warranty.

When I pressed Howie about the potential failure points on the Rotor he pointed out there are a few o-rings that can wear out, and that — like any bottom bracket — the bearings may eventually need to be replaced.

You'll find that routine maintenance is a bit more complex than standard cranks. You need to put a drop of oil on the o-rings every time you lube the chain, and check to make sure the "regulation point" hasn't slipped. Once a year or so you need to squirt some grease at the main bearings.

## Overall

The Rotor crank is one of the most exciting innovations in cycling I've seen in recent years, on a par with the improvements in tires, gearing, and aerodynamics that have contributed to the evolution of bicycle design. These things are the biggest improvement in riding I've experienced since I switched to a Bacchetta Aero.

From everything I can tell the product performs as advertised: it improves your speed, helps you climb hills, and reduces knee-pain — what could be better for 'bents?

Do I wish they were cheaper? Of course! But the gain in performance is comparable to upgrading to a new bike. So, if you've already done everything you can to maximize performance, the price is small for the leg up in performance.

## Info

Rotor Cranks cost \$665 (Cromoly) - \$865 (Titanium) and have a 30 day satisfaction guarantee. The cranks can be built with different sized crank arms and chainrings.

## Why Buy This Crank?

Better performance, healthier on the joints.

## For

Knee pain relief  
Better hill climbing  
Increased speed

## Against

Cost  
Adds 1 pound to the bike  
Greater complexity

## Contact

Rotor USA: Howie Cohen  
Email: howie@rotorbike.com  
Tel: 970/389-7082  
Web: <http://rotorcranksusa.com/>

## Credits

Matt Schneps, when not out riding, directs SportSmarts, a science education initiative of the Harvard-Smithsonian Center for Astrophysics in Cambridge, MA. All photographs by the author unless noted. ♦

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bent for non-competitive events.

### Giant Revive Gearing

Your RCN 081 article on the Giant Revive mentioned that: "Options for widening the gearing include changing the rear sprocket from a 16-tooth to a larger version. We've been told that this can cause interference with the chain cover, so be careful."

My curiosity piqued, I took the plastic cover off the local shop's DX model and measured the clearance between the upper chain run (from the sprocket to the chain ring) and the inside top of the chain case. There appears to be a little more than 3/8" or 0.375" of headroom.

The Nexus cogs are available in 16-, 18-, 19-, 20-, and 22-tooth versions. If one were to install, say, a 19-tooth, that would increase the radius of the cog by  $(19-16) \times 0.5" / (2 \times 3.14)$ , or about 0.238", which would leave a snug but perhaps manageable  $0.375" - 0.238" = 0.137"$  or approximately 1/8" of clearance. The fact that such clearance would be very close to the cog and hence less prone to chain bounce might make it tractable.

A 19-tooth would of course reduce the lowest gear from 35.4" to 29.8", about a 16% reduction. This is a modest change, but perhaps worth the trouble.

Alex von Braun  
avonbraun@hotmail.com

### My First Recumbent Year

I'd wanted a recumbent for several years and finally took the plunge after too many rides with sore butt and back. I ended up buying a bright yellow Lightning Thunderbolt which I have upgraded quite a bit (new chain, derailleurs, rims, and tires).

I've met a few recumbent riders down here in Southern California and experienced snobby attitudes from some of them. The bikes either had to be speed demons or look absolutely perfect. Generally, recumbent riders are nice, but there were a few condescending comments, such as, "my, my — it's a Thunderbolt!"

I became uneasy because I didn't spend \$2,600 for a low racer or \$3,500 for a highracer to keep up with the other riders. I kept riding and continued to get stronger. My Lightning is no featherweight, but it performs as well as bikes costing up to \$1,000 more than I spent.


After a year I still enjoy riding this bicycle. Everyone waves at me, even the roadie racer types. I have a friend with whom I ride most weekends. I keep up with him most of the time, slower on hills, faster on downhills. I'm planning some longer rides for the summer.

The recumbent acclimation period took longer than I anticipated. I needed time to really get comfortable with the position and with the whole philosophy. In the end, it's all about what you want, not what others think you should ride. I look forward to my time on this speed machine (my description).


Irwin Koransky

**Editor's Comment:** *It's too bad that you experienced recumbent elitism and condescending attitudes. The recumbent world is still very small and we all need to stick together. With the proliferation of high performance bikes, and the overall high cost of recumbents the elitism situation seems to be getting worse in a few areas.*


*Rider groups should encourage newbies, but newbies need to know the level of the ride they are showing up for. It is better to be up front about this then to leave new riders in the dust. It might be a good idea for rider groups to label rides by difficulty and pace (Easy <10 mph, Leisurely 10-12 mph, Steady 12-14 mph, Moderate 14-16 mph, Brisk 16-18 mph, Strenuous 18-21 mph, Super Strenuous 22+) and by terrain (on-road, off-road, mixed, flat, hilly, etc). If you can't find a recumbent rider group, join your local bike club and attend rides that meet your needs and fitness level. ♦*



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shops. Various models will be available for less than \$180.

Plans for limited edition models such as a smaller 16-inch bike, a larger 26-inch bike, a 20-inch girl's bike, and even a trike for the youngest cruiser are already under way. A full array of official Schwinn Sting-Ray parts and accessories will be available soon. Schwinn also plans to reissue two highly anticipated models of the original classic Sting-Rays: the Coppertone-colored Sting-Ray and the highly-collectible Grey Ghost.

### The Stiletto

No, not the carbon fiber mystery recumbent — this is the new \$400 chopper from the Giant Bicycle Company. This new unisex frame stretch frame cruiser will be available in several custom colors. The frame is Hi-Tensile steel with an oversized Cromoly triple-clamp chopper fork. The Stiletto is outfitted with a Shimano Altus rear derailleur shifting seven derailleur gears. Stopping comes from one Tektro disc brake. The wheels are a 24" rear and a 20" front. The bike includes a kickstand and chainguard.



Kona's Bike Hot Rod

While we haven't actually seen a Stiletto, it appears that this bike can be ridden by an adult. With a bit of customizing you could add more gears (Schlumpf drive or SRAM Dual Drive?) and a front brake. ♦

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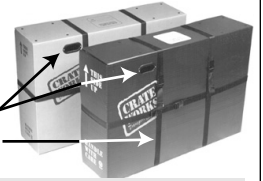
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bike noticeably faster. Several Bacchetta Aero riders have added Rotor Cranks to this very lightweight bike (add one pound), so they must be seeing some improvement.

I picked up a copy of Velo News (bike racing mag) which showed me all of the best aero wheel sets, listing their weights and prices. The Hostel Shoppe catalog shows aero wheel sets for recumbents listed by size, price and weight. I've read that if a spoke on an aero wheel fails, it can leave you stranded.

Rolling weight, or the weight of wheels, is also a consideration. Fancy aero wheels may not be as robust as traditional wheels. I hesitate here because I've had a fair amount of trouble with traditionally spoked machine built wheels. So my advice is that if you're going to upgrade, a good set of hand-built or other high quality wheels is the best place to start. Machine built wheels are just not as good.

### The Cost of Losing Weight

Reducing the weight of a recumbent bicycle can be expensive. The three-pound weight difference between an aluminum Easy Racers

Gold Rush and a Cromoly Tour Easy translates to about \$1,000 or \$333 per pound. There is a 6-7 pound difference between a Bacchetta Strada and a Bacchetta Aero, which translates to about \$2,000 or, again, \$333 per pound. All of these bikes are excellent performing bikes. Whether or not you should spend up for the lighter fast one depends on your pocket book.

I've ridden both a Tour Easy and Gold Rush extensively. The Gold Rush is faster across the board (acceleration, top speed, climbing and sustaining speed) — all because it's lighter. Most Bacchetta Aero riders will mention that one of the beauties of this 22 pound recumbent is it's climbing ability. This bike has given an uphill performance boost to many recumbent riders and changed many viewpoints about recumbent bike weight.

For many of us losing weight on our bodies is far less expensive (though arguably more difficult) than paying for a lighter bicycle. It's my feeling that to effectively use ultimate technology, you need to be reasonably fit (much of this lightweight bicycle technology is designed for 150-175 pound riders).

### Durability & Weight

Mono-tube frames, aero wheels and racing parts may have a shorter life-span and you may need more spare parts (like racers). More durable mid-range components, hand-built wheels and triangulated frames can be heavier, but should be more robust and last longer. Finding what works best for you is the key.

### Wedgie World

At mountain bike legend Keith Bontrager's web site, he discusses mountain bike performance as related to weight and climbing. In his Rant, "Lightweight Parts" ([www.bontrager.com/keith/rants.asp?id=25](http://www.bontrager.com/keith/rants.asp?id=25)), Keith writes that the difference in 2 pounds off of a 25-pound mountain bike weight saves .12 minutes (7.2 seconds) or .05 mph over a 1-mile climb.

Lance Armstrong's US Postal team says that 1/4 pound is worth 10 seconds to him on a Tour de France stage. Also worthy of note is that most Tour bikes are carbon fiber, aluminum (or a combination of the two), running Campy or Shimano Dura Ace components (Hmm, no SRAM components).

I've been told that the Trek carbon-fiber bikes are very tough. Carbon fiber recumbents don't have as good of a track record and aluminum frames are usually not as tough as steel ones.

### The Right Bike for the Right Job

Neighborhood recreational riders don't really need to be concerned about bike weight.

Bicycle commuters and tourists are concerned about weight, but even more concerned about durability out on the open road and cargo carrying capacity.

Bicycle racers are concerned about light weight, ultimate performance and having a performance edge over others in their group.

A serious cyclist can utilize several bicycles. Rarely, but sometimes, do their uses overlap. I like to have a fast bike for open-road training and club riding, a commuter that can tow a trailer, haul a load and is set up for riding in the rain. Those who tour will want a robust touring bicycle. I also like to have a few up-rights. Experiencing the new road bike technology is a fun experience. A one-speed or fixed gear bicycle is the ultimate in light weight simplicity — and will whip your butt into shape.

Bicycle weight and performance are complex issues. To make it work to your advantage — first get your body in shape with a training program. Next, choose the best bike for your task at hand. All else being equal, light weight is good — just don't go crazy on the subject. If you already have a fast bike, carefully consider the costs and trade-offs involved in making it lighter. And remember that losing weight on your body is usually less expensive than losing grams in bicycle componentry. ♦

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