RCN

RECUMBENT CYCLIST NEWS

Issue # 67
Jan/Feb
2002

The Cannondale Easy Rider CLWB Recumbent glides into dealers for 2002

In This Issue

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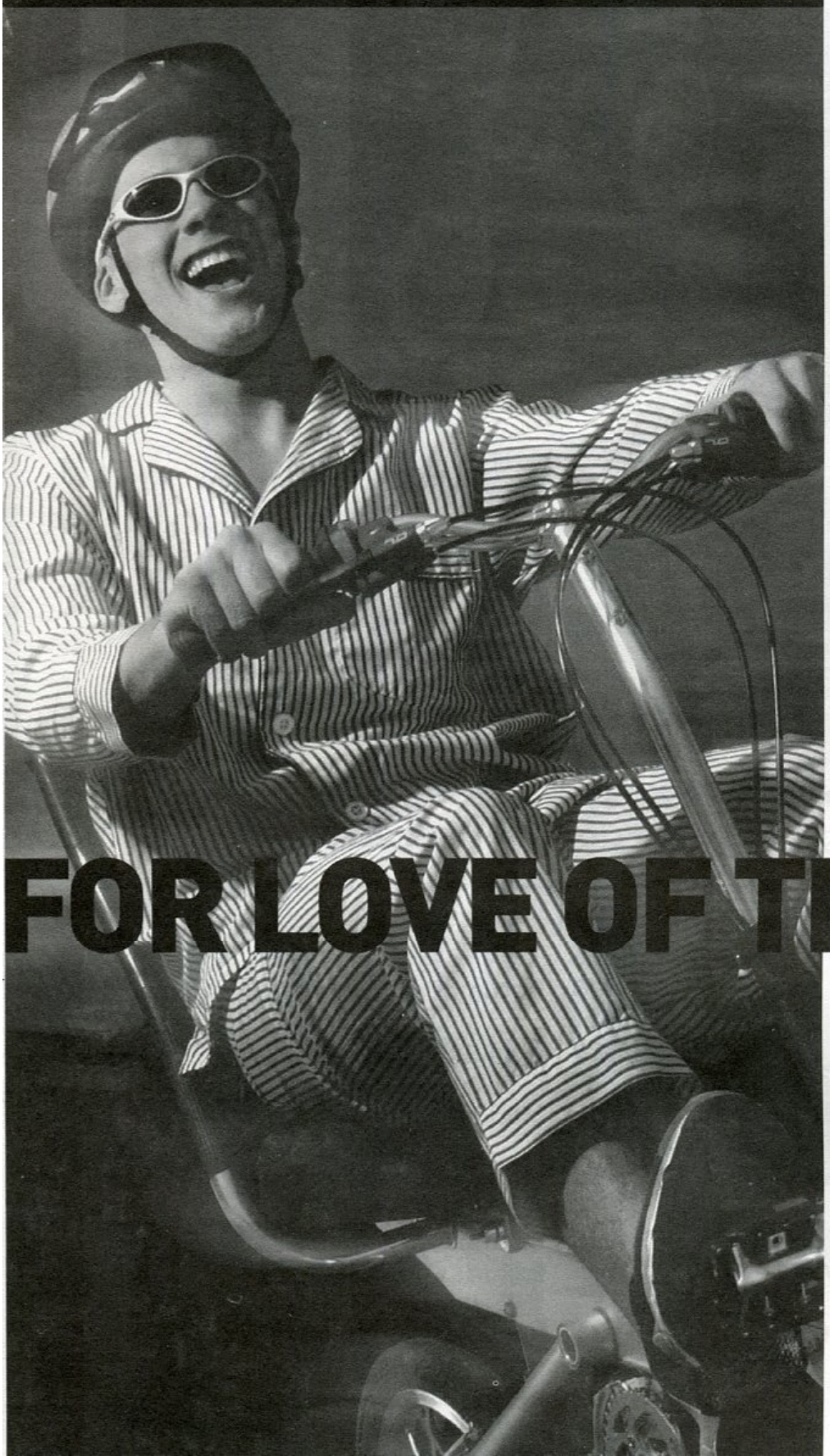

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RCN
RECUMBENT CYCLIST NEWS

PO Box 2048, Port Townsend, WA 98368

RCN#67 Jan/Feb 2002
Celebrating our 12th year!

A Newsletter by recumbent bicycle enthusiasts, for recumbent bicycle enthusiasts, since 1990

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Schedule
Expect RCN to arrive every other month. Issues should arrive by the end of the first week of the 2nd month of the issue's date. Email us to check if we are late.

Renewals
Please renew 3 months in advance if you can. By the time you read this issue, the next issue and database have gone to the printer.

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RCN Back Issues Available
RCN#65, 64, 63*, 62*, 61*, 52, 51
Cost is $7 (1); $20 (3); $35 (6).
Trike road tester: 20 pages about trikes for $9; RCN#60 short reprint $8.
We will reprint articles on request. The cost is $2 short /$3 medium /$5 long per article.
**Limited quantities*

Editorial License

Welcome to Recumbents 2002

by Bob Bryant
bob@recumbentcyclistnews.com

Welcome to the RCN 2002 Season Preview/Resource Guide. In this issue you will find our carefully compiled 2002 recumbent bicycle information.

Our intrepid reporting staff was in Las Vegas to report on the Interbike show this past Fall and we have a full report.

We have refined our recumbent buyers' essay once again in the long version. A short version is available by SASE to RCN. A World View guest recumbent primer is also included in this issue.

Recumbent bicycles are getting better and better. The designs are showing more refinement—which makes our job a lot easier. The 2002 model year looks to be a good one, with excellent values, refined classics and a few new bikes to stir up the mix.

DAILY RIDE

Don't get the idea that RCN is a huge publishing empire. We publish from our home office. There is no huge fleet of bikes and we don't have a smooth concrete, banked curves, test track hidden in the outskirts of town.

The basis of my reviews comes from the real world. I ride a 12 mile loop into town to pick up the mail. I ride off-road, on hiking trails, rough concrete, smooth concrete and even gravel rail-trails.

Test bikes accepted by RCN (as of 2002) must be capable of this real world use. This means they must be safe for riding on the road. They also must have robust tires, fenders and a method in which to haul cargo. We put the bikes through the real world test and will report our findings to readers.

RCN also accepts articles of other types from readers and free-lancers (email or SASE for info). We also comp a subscription or renewal when your article is published.

Despite our real world attitude, we welcome articles from recreational riders, long distance tourists, club riders and high-performance riders/racers.

RCN COSTS

This year we have seen an increase in all of our costs—plus a 17% increase in postal rates. Publishing a small magazine is getting more difficult. Rather than increase rates, we must find ways to streamline our processes. For 2002, we have actually lowered our subscription rates, though we will be raising ad rates. This reduction may be temporary, but we'll see if it brings us an increase in circulation (which we truly need).

12 YEARS OF RCN

I truly love publishing this small independant newsletter/magazine. We've been publishing for over a decade—12 years to be exact and 67 issues of <mostly> on-time service.

Our mission is to write ***FOR THE READERS***. RCN is written by recumbent bicycle enthusiasts, for recumbent bicycle enthusiasts—as we have done for the past decade plus.

Our goal is *NOT* to whip you into a buying frenzy. We want to provide an open communication and recumbent education from a variety of viewpoints. This will undoubtedly include some critical review because this has proven to make bikes better (ADvertorial reviews are L A M E!). We hope to do this while making RCN entertaining and fun to read.

Viva Recumbency
Bob Bryant

Corrections—The 2002 price of the ATP Vision Saber R64 is $1995. The 2002 price for the ATP Vision Saber R65 is $2800.

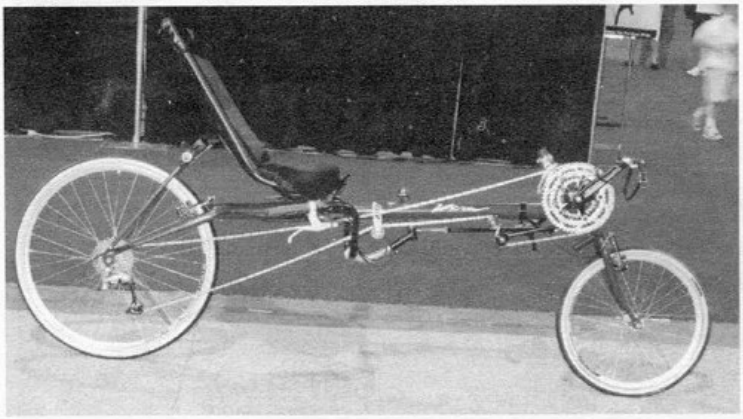
On the cover—The long awaited 2002 Cannondale Easy Rider recumbent bicycle

In our last issue—RCN#66 Nov/Dec 2001—This issue was mailed in late November. It has a yellow cover.

Our next issue—RCN#68 March/April will be out in two months—you should have your copy by April 1st, 2002. ◆

RCN DATABASE NOTE
We DO NOT release, sell or, give out your personal information, address, or anything of the like. In fact, we will not release your address, phone number or email address even to other RCN readers. We will pass a letter on to you if an SASE is provided.

Recumbent News



VISION UNVEILS NEW R40 MWB

Vision has always produced a long wheelbase (LWB) version of the venerable R40. This year, we have updated the design to a medium wheelbase (MWB) style. Instead of the front wheel being mounted 6-inches out in front of the crank, we have mounted the wheel directly under the crank. This position saves weight on the bike and improves the turning radius, while maintaining the stable handling and comfortable ride longer wheelbase bikes are famous for. The R40 MWB is available for $1220, or as a short wheelbase (SWB) bike with an MSRP of $1095. The bike can be converted between the SWB and MWB modes at any time just by changing the crank boom. Components on either version of the R40 will be a Shimano Deore group, complimented with TruVativ Elita cranks and Avid brakes.

Source: ATP Vision ◆

Trikes CD-ROM from Westcountry Recumbents

Our latest project is designed to bring together pictures, video and reviews of as many recumbent trikes as we can find. The idea is to focus mainly on the visual, with web links to the manufacturer's sites for access to the latest technical specifications and pricing.

Over forty machines from three continents appear in this first edition - tadpoles, deltas, sociables, and even the occasional quad!

At $10 (including worldwide postage) this is an invaluable aid to making that important trike decision.

Details and ordering information at http://trikescdrom.com or follow the links from http://www.wrhpv.com. ◆

This CD is a must have for any serious trike buyer. It reads through your web browser. It will offer hours of trike surfing—Bob Bryant

2002 Ice Explorer Trike

VISION INTRODUCES COMFORTABLE UPRIGHT BIKE

For 2002, recumbent maker ATP Vision has expanded their bicycle line to include upright bicycles. The new V70 and V72 "Thoroughbreds" are Vision's entry into the new Comfort Bike market.

This new bike has rotated the rider's traditional upright position back 22 degrees, and moved the seat, handlebars, and crankset appropriately. The saddle low enough so the rider's feet can easily reach the ground, when the seat-to-crank position is set appropriately. The weight on the rider's hands and been reduced. The more heads up position also gives a better view of the road.

Traditional bikes have a high top tube and saddle, making it difficult to get on and off the bike and reach the ground when mounted. The new Vision design has a lower top tube and seat, for a much easier mount and dismount. It's now very easy to reach the ground with your feet from the saddle.

Traditional bikes transfer a lot of weight to the front wheel during braking, which can cause the rear wheel to skid, and can even "pitchpole" under heavy braking, tossing the rider over the handlebars. The new Vision design has the rider lower and further back, improving braking and making for a safer ride.

The V70 has a suggested retail price of $649.95 and the V72, with upgraded componentry, retails for $849.95.

Source: ATP Vision ◆

WinkelWheel.com is Online!

Custom built wheels are now available—built to your exact specifications! Our new website is the ONLY bicycle wheel website that has a custom configurator available. With this unit you can select individual components from our wide stock of rims, hubs and spokes, building the exact wheel you want. If you are not sure about what you want, we have an extensive education section available—built on the 25 year experience of Jeff Winkel. If you prefer, you can also buy from our selection of pre-built wheels available at rock-bottom prices. A simple click and select gets your wheels on the way. All of our wheels, pre-built or custom, come fully guaranteed, and typically ship within 5 days of the order.

Source: ATP Vision/Winkel Wheel press release ◆

Battle Mountain, Nevada—Cyclist rides a human powered vehicle at a world record speed of 80.55 miles-per-hour

The 2001 World Human Powered Speed Challenge (WHPSC) was held at Battle Mountain, Nevada, October 1-6, 2001. Five teams from the United States, Canada, and the United Kingdom gathered and set nineteen world records speeds—even though many records lasted for only a day or so. The highest speeds over the six day meet are now the world's fastest for single and multi-rider HPVs recognized by the International Human Powered Vehicle Association (IHPVA). The city of Battle Mountain is 217 miles east of Reno, Nevada at an elevation of 4500 feet (1370 meters). The event was run on a stretch of Nevada Highway 305 about 14 miles south of Battle Mountain.

Canadian Sam Whittingham riding the streamlined HPV Varna Diablo covered the 200 meter section of the five mile straight and level course in 5.5 seconds. Varna Diablo, designed and built by Canadian sculptor Georgi Georgiev from Gabriola Island, British Columbia, also set world records at one kilometer of 79.79 m.p.h. and at one mile of 78.64 m.p.h.

In the multi-rider category—the tandem Double Gold Rush ridden by Fred Markham and Chris Springer also set world records at all three distances: 200 meters at 68.36 m.p.h.; one kilometer at 68.91 m.p.h.; and one mile at 68.52 m.p.h. Double Gold Rush was designed and built by Gardner Martin from Freedom, California.

The speed runs were observed and timed by the Human Powered Vehicle Association (HPVA), the North American affiliate of the IHPVA. The WHPSC Race Organizer was Sean Costin from Arlington Heights, Illinois. Costin was assisted by the Battle Mountain Chamber of Commerce. The IHPVA and HPVA are non-profit charitable organizations staffed by volunteers. There is no prize money and teams pay their own expenses.

The other three teams were also winners. On Wednesday evening the University of California—Berkeley tandem Bearcuda ridden by Andy Jaques-Maynes and Lance Doherty set the multi-rider kilometer record at 66.13 m.p.h. and the mile at 65.95 m.p.h.

On Friday, Matt Weaver rode Kyle Edge to a record speed for the kilometer of 76.40 m.p.h. and the mile at 75.51 m.p.h. Weaver, from Aptos, California, designed, built and rode Kyle Edge. On Saturday, the English Blueyonder, ridden by Olympic Gold Medalist Jason Queally, set British records for all three distances: 64.34 m.p.h. over 200 meters; 63.67 m.p.h. over a kilometer; and 63.14 m.p.h. over a mile. The radical new Blueyonder HPV had teething troubles that were not completely solved, but it made striking improvements each evening during the meet. All the vehicles at the race were bicycles.

At the Saturday night post race banquet, trophies were presented to riders Whittingham, Markham, and Springer and to designers Georgieve and Martin. In a special ceremony, three of the participants were awarded plaques as the first inductees into the HPVA "Hall of Fame." Georgi Georgiev was cited For Outstanding Achievements in Human Powered Innovation. Gardner Martin was cited For Significant and Consistent Contri-butions to HPV Design and Racing. Fred Markham was cited For Significant and Consistent Contributions to the Sport of HPV Racing.

The goals of the WHPSC: to beat the single-rider record, set by Whittingham in Varna Mephisto at the World's Fastest Bicycle Competition 2000 last October in Battle Mountain, for the 200 meter flying start speed of 72.75 m.p.h.; to beat the 200 meter multi-rider record, set in 1993 by Markham and Whittingham riding Double Gold Rush at Alamosa, Colorado, of 65.03 m.p.h.; and to become the three fastest men in the world were achieved.

Source: John W. Cooper and Sean Costin, Race Organizer, www.wisil.recumbents.com www,ihpva.org ◆

BikeE Tandem Recall

In Cooperation with the U.S. Consumer Product Safety Commision BikeE is voluntarily recalling all 2000 and 2001 BikeE E2 model bikes. E2We have encountered three situations in which the steerer tube seperated from the front fork crown. No injuries were incurred. If the steerer tube were to seperate from the fork crown while riding you could loose control of your BikeE which could cause serious injury or death. We ask that you immediately stop riding and bring your BikeE E2 tandem to your Authorized BikeE retailer for a no-charge recall service.

Fixing this problem is easy. If you have a BikeE E2 tandem, contact your local BikeE retailer to schedule a fork replacement. Your dealer will install a new front fork at no charge.

We apologize for the problem and thank you for your cooperation.

Please visit your authorized BikeE retailer/service center or call 1-800-231-3136 with any questions.

Rider Group Listings

▲ **California, San Diego: Easy Rider Recumbent Club** Richard Parks, 619-235-0854, r2parks@earth link.net; www.home.earthlink.net/~r2parks; or James Rudolph, 760-941-0367, bentcycler@aol.com.

▲ **Georgia, Atlanta: Atlanta Recumbent Cyclist** (Cartersville) Ben Watters 770-578-9380, BPWatters21@aol.com

▲ **Hawaii, Oahu: Hawaii Rainbow Riders** Lynn Miller, E-mail: millerl004@hawaii.rr.com, Tel. 808-456-5707.

▲ **Illinois, Champaign/Bloomington/Peoria** http://members.home.net/circ99/ or email address bwebster59@home.com

▲ **Iowa, Des Moines: Team ROMP** (Recumbents Out Mega-Pedaling) Contact: Lori Leporte 515-287-5556 or greenbikespike@home.com, www.teamromp.com

▲ **Michigan**: **Wolver-Bent Recumbent Cyclists** Bob Krzewinski, wolverbob@cs.com, 734-487-9058, www.lmb.org/wolbents.

▲ **New York, Hudson Valley**: **Tri-State region for Easy Rider Recumbent Club** Justin Horowitz, 845-658-3401, dandjhorowitz@cs.com

▲ **Oregon, Portland**: **PURR, Portland United Recumbent Rides**, Various locations and distances. Connie McAyeal 503-647-2438 ohyesbent@hotmail.com

▲ **Washington, Vancouver** (and Portland, OR area): Contact Jeff Wills 360-254-3736 or jwills@pacifier.com

▲ **Washington, Port Townsend**: Bob Bryant 360-344-4079, bob@recumbentcyclistnews.com.

▲ **Washington**, **Seattle Recumbent Riders** Charles_packard@hotmail.com or 206-283-7716.

▲ **Washington**, DC WHIRL www.recumbents.com/whirl

▲ **Canada, Ontario HPVSO** www.hpv.on.ca

For other listings, see www.recumbents.com and click on "Clubs."

Attention Rider Group Members & Leaders

We are rebuilding our rider group listing from the ground up. Please send us your current rider group contact name, phone and website or email. Thank you

Events Calendar 2002

June 28-30, 2002
European Championship/Cycle Vision 2002
Lelystad, The Netherlands, will host one of the biggest recumbent events in the world.
Contact: For general information about last year's event, take a look at: www.ligfiets.net/cyclevision/english/index.html Information about the location can be obtained at: www.ligfiets.net/cyclevision/english/location.html

August 17-18, 2002
Annual Recumbent Retreat
Fort Stevens State Park, Oregon
Rides, banquet lunch, potluck, bike lighting contest, and various activities with Recumbent enthusiasts.
Contact: Connie McAyeal 503-647-2438 or ohyesbent@hotmail.com

Other Events
Spring 2002—Midwest recumbent rally. Contact: The Hostel Shoppe in Stevens Point, WI.

Please email your event information to: bob@recumbentcyclistnews.com or mail to: RCN, PO Box 2048, Port Townsend, WA 98368.

Recumbent Mail

If you have something to say, a differing viewpoint or experience—we want to hear from you!
Please limit letters to 300 words. No charity ride sponsorship request letters.
RCN reserves the right to edit submissions for clarity, content and space limitations.
bob@recumbentcyclistnews.com or RCN, PO Box 2048, Port Townsend, WA 98368

California Aids Ride Response

As a fellow recumbent and California AIDSrider (my husband and I have participated in three separate rides)—I was appalled to read Marty Goodman's thinly veiled rant concerning the AIDSRide this summer in RCN#66.

First and foremost, Mr. Goodman's opinions do not reflect the experience or opinions of any of the other nearly 2-dozen recumbent AIDSRiders. I know this first hand because shortly after the Ride, Mr. Goodman emailed this same rant to us as part of a round-robin discussion about our experiences. The reaction from the group was immediately and unequivocal: Grow up!

Mr. Goodman's actions were way out of line, both in terms of safety and general courtesy. The stretch of road he refers to was Highway One just north of Santa Barbara. A four lane freeway where it is illegal to "take a lane" by bicycle no matter what the circumstances. Before the start of that day's ride every cyclist was cautioned to ride single file (except when passing of course) and to use all due diligence on what would be a very tough stretch of road. Up until then most of the ride had been on 2-lane blacktop; this would be the group's first experience riding on the shoulder of a major highway—in busy traffic—since completing the first day. Up until then, the California AIDSride had never had a biking related fatality—they certainly didn't want to start now.

The safety monitors were correct to reprimand Mr. Goodman. They did what they were supposed to do—control a vast group (2,800!) of riders to ensure the safest possible experience for all. They did this for free, day in and day out, rain or shine, for 12 hours a day. They were well educated, professional, courteous to a fault, and merciless when it came to reckless behavior. The did their job.

By his own admission, Mr. Goodman was poorly trained. If he had chosen to practice in any of the hundreds of training rides offered before the Ride this summer then perhaps he wouldn't have been so uncomfortable riding in such a large group event. Perhaps he would have been more aware of the rules and protocols the AIDSride employs. Perhaps he would have been able to control his speed more effectively in the presence of slower riders. As a veteran AIDSRide recumbent rider I know this can be the biggest challenge. But with a little practice and a lot of patience I've learned to integrate myself relatively seamlessly into the pack and still do the kind of riding I want to do. Perhaps with more training Mr. Goodman would have understood this too.

Lastly, as a Ride participant, I was saddened most by Mr. Goodman's total lack of understanding of why the ride even exists. There was nothing in his article that captured the true nature and purpose of this extraordinary experience. The California AIDSride exists simply and wholly to help those with AIDS/HIV who can't help themselves—the poor, the uninsured, and the abandoned. Many of the riders have lost loved ones to this horrible disease, some are affected themselves. Many ride well past the point of endurance, driven by the love and encouragement of their fellow riders to achieve goals they never thought possible. This is an event that brings an unbelievable group of people together—straight and gay, drag queens and corporate officers, teenagers and grandparents, black, white and brown—who for one shining week put the "real world" behind them and work for the common good. That is the Ride I and my fellow cyclists participated in. I only wish Mr. Goodman had been able to share in it too.

Marta Evry, Rider #6341
msblucow@earthlink.net

Editor Comments—*One other rider who rode in this event wrote RCN about problems like those Marty Goodman encountered and outlined in his RCN#66 article. We have also received a report that the nonprofit that runs the California AIDSRide has dissolved their relationship with Pallotta Team Works.*

A Changed World...Comments

My honest and sincere congratulations on your RCN#66 editorial. You hit the mark dead center in my view and I'm making copies of it to pass out to my cycling friends. May I recommend that you check out www.orion.org/pages/oo/sidebars/America as it is another excellent source of essays about our need to look inside and consider/reconsider our priorities.

Pat Kraker

Editor Comments—*If you liked my editorial, be sure to check out this new book: The Better World Handbook: From Good Intentions to Everyday Actions from www.newsociety.com.*

Pat delivers bread in Virginia using an ev-assist Lightfoot Transporter. We are expecting a report soon.

Essential Cycling Tunes

I just wanted to thank you for your article in RCN #65! Next to bicycling, my next favorite hobby is listening to music. I have been downloading MP3's and using my portable player whenever I ride my Wicks Trimuter recumbent trike. I enjoy a variety of music. When I want to relax I listen to music like sounds of nature.

Today I had every song in your article loaded in my MP3 player and really enjoyed the variety. Let me know if you come up with another list in the future!

Randy Olson
Wicks Trimuter

Babich Editorial Feedback

I read Amy Babich's editorial in RCN#65, and agreed with her underlying premise that more effort should be put towards making city streets and highways more bike-friendly. However, much of her editorial is remarkably extremist and inaccurate, and she does the biking community no service by portraying bikers as anti-industry and anti-car. Most of us are not, and do not use words like stupid, deranged and suicidal to describe people who don't bike.

Her editorial is somewhat contradictory. She chooses to live in Austin, and in fact supports their Great Streets project, while at the same time calling those who live in cities where food must be imported "very stupid." She disdains planes, cars and trucks, yet writes for a magazine delivered all over the country by those same vehicles. She claims that cars are making the air worse and worse, even though in cities like LA, where most of the air pollution comes from cars, the air has been steadily getting better for the past 30 years.

In addition, Amy seems very concerned over how people see her on the road. I can't see how this is important. Who cares whether someone thinks you're getting ready for the Olympics, or riding to

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please notify us ASAP.
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bob@recumbentcyclistnews.com

work, or engaged in some senseless pursuit? She even comes down on people who call their bike riding "training." One can only imagine how much she would scorn someone who refers to bike riding as exercise, touring or commuting. Does it really matter what we call it, or what other people think? Isn't the important thing to be out there riding?

I consider myself an environmentalist. I generate most of my power via solar, because I believe in renewable energy. However, I would not consider Amy "deranged and suicidal" even if she relies on utility power, most of which comes from coal, our dirtiest non-renewable power source. I ride my Greenspeed to work most days, but do not consider the other drivers on the road "insane"—just people who have made different choices than I have. If Amy expects tolerance from a car-centric world, perhaps she could start by showing some herself.

Bill Von Novak
billvon@qualcomm.com

Editor Comments—*Today I read in our local weekly newspaper in our small town of 8,000 that yet another cyclist had been hit by an automobile. The other day while riding through town with my kids, a driver sped ahead of us and took a hard right turn in front of us into a store parking lot. The driver was oblivious to our presence.*

Amy's quote in RCN#66 was, "The people of the car culture are behaving in a deranged and suicidal manner." Amy's stand may be a tad extreme. However, when you in the trenches, daily on your bike, and you deal with "close calls" often, you may find yourself enraged and wondering what you can do. The fact is that the automobile and our car-culture, which is brought on by Urban Sprawl (strip malls, big box stores, etc.) is totally to blame. As cyclists, it is time to do our part to turn the tides. Any concerned cyclist should reexamine how they live their lives and if they are part of the problem or part of the solution.

Demise of the Trek R200

I was just at the Trek web site, and they do not list the R200 among their 2002 models. If the web site is any indicator, it looks like you're right, and they won't continue with the R200. That's too bad, because it would have been nice to see a major manufacturer get on board with a 'bent model. I guess they have to look to the bottom line, and presumably the R200 wasn't giving them what they wanted there—although arguably the bottom line would have been better if they had promoted their recumbent—at all.

I bought an R200 last year. I've been pretty happy with the bike. It is fun to ride and very comfortable. I have had no trouble with it.

I continue to enjoy RCN. I'm willing to pay your subscription price for the sake of your independence and maverick approach to publishing. I think you'd be hard pressed to maintain those qualities if you were to switch to a slicker format. You have to do what works best for you, but my vote would be to continue as you are.

Phil Shanholtzer
PandCShan@aol.com

Saber Comments

In response to Rob Welsch's article on the Vision Saber in RCN#66. A solution to the need for the Flight Deck Computer in order to check what gear one is in may come in the form of Shimano's "in-line rear indicator." This inexpensive gizmo is stock with any road bike that has Dura Ace components and could be a great solution to having buy the Flight Deck Computer. You can check it out on page 488 in Quality Bicycle Products consumer catalog.

Andrew Peters, Mgr.
Budget Bicycle Center, Madison, WI

Trek & Easy Racer and RANS V2 Rider Feedback

I found RCN#65 interesting for several reasons. I own both a Tour Easy SS and a Trek R200. I have also ridden a RANS V2. In general, I agree with Mr. Remington's comments in his article, "Easy Racer Tour Easy vs. RANS V2: A Comparison." I have a few comments to add to his. Switching back and forth between the Easy Racer and the V2, I was always faster on the Easy Racer. I believe that the reason for this are as follows: the larger 700c rear wheel on the Easy Racer; the straighter chain line and better chain tension device on the Easy Racer; and last, the lower bottom bracket on the Easy Racer. Keep in mind that this is strictly my preference. Many people prefer a high bottom bracket and are faster with them.

I would also like to comment on the article, "Final Days of the Trek R200 SWB." Despite Trek's efforts to sabotage their own product, the R200 is an excellent recumbent. I also had shifting and chain problems at first. I learned to set the bike up properly by reading RCN#55 (Trek road test). Ron Friedel's comments summed it up, "get rid of the crummy early factory chain retention kit and readjust your derailleurs. I would also suggest that you ditch the Primo Comet tires and put on some fat ones like the Comp Pools, etc. I like variety and enjoy owning three styles of recumbents: SWB; CLWB and LWB. The R200 is the only SWB that I have been able to ride without foot and leg discomfort (due to the lower bottom bracket height). I used to own a RANS Rocket but even after a year, I had numbness and leg pain. You riders out there that have your R200's should feel lucky that you were able to get one while they were still available.

I realize the problems you have getting bikes to test from manufacturers that expect preferential treatment. If they're afraid of an honest test of their product, then it probably isn't worth owning. The thing that I miss is the reader road tests is your input. You've ridden most recumbent bikes while most of the testers have only had a few to compare to the test bike. I really value your opinion.

Bill Kunkle
BKNKLBENT@aol.com

Editor Comments—*The Trek is a decent recumbent for those who understand what they are getting into. Hopefully, our (RCN#65) article will help new owners keep them on the road for awhile. I liked the lower bottom bracket of the bike. Trek did a very poor job supporting and marketing this product.* ◆

Recumbent Glossary

ASS—Above-seat steering: Handlebars above the seat, knees or frame. A bicycle type of bicycle steering. Also known as over-seat steering (OSS).
Bar-ends: MTB handlebar extensions most often used on USS bikes to bring the controls closer to the rider.
Bar-con: Shifters mounted at the ends of the handlebars.
'Bent: Slang for recumbent.
Body stocking: A soft full fairing, usually made of Lycra or other stretchable fabric.
Bottom bracket: (BB) pedal axle & bearings
BB: Bottom-bracket or boom bracket (pedal axle).
Cantilevered stays: untriangulated monotstays.
CB: Crank bracket; also known as bottom bracket or boom bracket; the frame piece which holds the bottom bracket.
CG: Center of Gravity—usually at ones belly button.
Chain idler: Skateboard or rollerblade wheel that directs the chain through the frame.
Chain management: How the chain is managed, via idlers/tensioners though the chain path.
Chain tube: Flexible tubes used as chain idlers.
Compact long-wheelbase: CLWB, a compact version of the LWB recumbent with a 20/16 wheel combination and mostly low pedal height.
CLWB: Compact long wheelbase.
Coroplast: Plastic cardboard used for crafts and political signs that works great for homebuilt recumbent fairings.
CroMo: Chrome-moly steel used in frames.
Delta trike: Two wheels in the rear.
Dual Drive: See also SRAM/SACHS 3x7/8/9
Fairing: An aerodynamic windscreen designed specifically for recumbent bicycles.
Flip-It Riser: SWB above-seat steering riser that has an adjustable recline angle and folds forward for easy entry and exit (RANS term).
FWD: Front Wheel Drive
Gear-inch range: Front chainring tooth count divided by the number of rear cog teeth multiplied by the actual measured drive wheel diameter. (High: large front to small rear/low: small front to large rear).
Heel interference: When your heel crosses the path of the front wheel.
Hiten: High tensile or mild steel used for entry level recumbent frames.
Highracer: A tall performance SWB that uses full size bicycle wheels.
Horizontal: Another term for recumbent bicycle.
Indirect steering: Steering via rod linkage that connects the handlebar to the fork.
Jackshaft: A non-shifting mid-drive crossover used on some two-chain recumbent drivetrains.
Lowracer: A very low and stretched out SWB racer.
Leg suck: When your feet slip off recumbent pedals and 'suck' back under the seat and bike.
LWB—Long wheelbase: Pedals usually low and behind front wheel, seat can be low or high.
MWB—Medium wheelbase: A design that is in between a SWB and CLWB with the bottom bracket high and at the head tube.
Mid-drive: A mid-ship mounted, two-chain drive gear set (crankset without crank arms or modified cassette gears) shifted by a derailleur.
Mid-wheelbase: Same as a CLWB compact (used by Cannondale).
OSS—Over-seat steering: Over seat steering (same as ASS)
Pedal steer: Pedal-induced steering input that makes the bike more difficult to track straight.
Pedal height: The height of the pedals at the bottom bracket spindle (axle).
Pogo: Unwanted pedal-induced suspension movement.
SWB—Short-Wheelbase: A recumbent style with a higher bottom bracket height. The crank is ahead of the front wheel and higher up.
SRAM/Sachs 3 X 7/8/9 Dual Drive: An internally geared 3-speed hub used in conjunction with a 7-speed freewheel (21 speed total). Gear #1= reduction underdrive, #2 =1:1 lockup and #3 = overdrive.
Swing arm: The rear frame section that is suspended (on a suspension recumbent design).
Speed Drive: Schlumpf's two-speed internally geared bottom bracket.
Steering rod: A rod that connects the fork to the handlebars.
Stem riser (also known as "mast"): An ASS extension that rises from the stem/head tube raises bars over the legs.
Tadpole: Trike with two wheels in front.
Tiller: A long distance between the head tube and controls can create a feel much like the feel of a tiller of a boat. This effect can be found on LWB & SWB. Some consider this a negative trait, others do not.
Tailbox fairing: An aerodynamic tail section often used for storage, mostly homemade of coroplast. Fairings are mounted on a rear rack, cut to shape and stitched together using zip-ties, etc.
USS—Under-seat steering: Steering via handlebars beneath the seat.
X-seam: A recumbent fit measurement that simulates the distance from the seat back/base out to the farthest reach of the pedal stroke. Sit with your back against a wall and measure from the wall to the bottom of your foot. ◆

Interbike Report
& 2002 Recumbent Preview

by Bob Bryant

When Interbike opened on Sunday, September 30, it was the largest trade show to be held in Las Vegas since the events of September 11. Nonetheless, according to show organizers, attendance was down only slightly, and the mood was upbeat as show goers took the opportunity to attempt to return to "the larger world of smaller concerns" as SF Gate writer Carol Lloyd put it.

Cannondale—This year's show saw one major bike maker, Trek, leave the recumbent market even as another, Cannondale, was entering. There have been rumors of one or more Cannondale recumbents circulating for several years, and prototypes have been seen, if only by a handful of people. Before the show, the Cannondale rumors picked up steam on the internet and pictures were circulated.

This time the rumors were true, and the pictures were of Cannondale's first production recumbent. Unlike Trek, Cannondale selected the more accessible CLWB format for their first effort (though they call it a "mid-wheelbase"). It is a format that is generally easy for a beginning recumbent rider to master, but there is nothing "entry level" about this bike.

The bike has full suspension, with a rear swingarm from one of their mountain bikes (a swingarm specific for the 20-inch rear wheel would have left the chainline too short for smooth shifting, according to designer Chris Dodman). Cannondale reports that the lower rear suspension pivot point will also help to aleviate suspension pogo. Front suspension for the 16 inch front wheel is provided by a Cannondale HeadShok MC60 unit. As with other Cannondale bikes, the frame is mostly fat, round aluminum tubes.

The mid-drive drive train offers 27 gears via Shimano LX derailleurs and a Deore cassette. Rather than using a full bottom bracket axle, the mid-drive rides on a small bearing assembly that screws into the right side of the bottom bracket shell. An eccentric crank bracket at the front provides for tension adjustment of the front chain. The front brake is a Cannondale Exp V-brake and the rear is an Avid mechanical disc. The seat has a beefy aluminum frame and is adjustable four ways, including recline angle. The seat slides on a rail attached to the frame. The bike comes in two sizes.

When this bike was first seen in pictures, the handlebar riser was straight and concern was expressed about reach. The riser seen at the show had some rearward offset, and the final production version is supposed to have still more. Weight is said to be about 36 lbs. Price is expected to be just under $2,000. The new bike will be available in two sizes that, combined, fit riders from 4'8" to 6'10". The seat height is 27-inches.

The working title for this bike seemed to be "Easy Rider." This elicited groans from the recumbent savvy, many of whom see the word "easy" as pretty much belonging to recumbent veteran Gardner Martin. Martin's company, Easy Racers, produces the well known Tour Easy, Gold Rush and TiRush LWB ASS recumbents. The name "Easy Rider" does not tie the new bike in any way to the rest of the Cannondale family.

For those old enough to remember the movie of the same name, and this may include a substantial number of people in the target market, the image also conjures up images of chopper motorcycles. There is more than a little chopper look in the Easy Racers bikes, but the Cannondale has a more technical look.

Recumbent veterans also wonder if Cannondale will provide their dealers, who in most cases will have no experience with recumbents, with sufficient training and background information about recumbents. Many recumbent people feel lack of support for the Trek bike contributed to its lack of success.

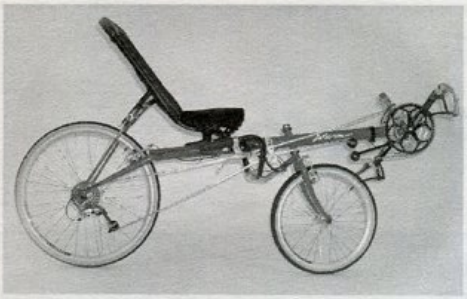
The Cannondale Easy Rider at the Interbike Dirt Demo in Las Vegas—John Riley

ABOVE LEFT: The Easy Rider mid-drivetrain and lower suspension pivot.
ABOVE RIGHT: Seat back and slider mechanism.

This bike will inevitably be compared to the BikeE RX. The RX costs a bit less. List price on a full suspension RX is $1,799, and by deleting the front suspension, the price can be brought down to $1,499. But the bikes look quite different, with the Cannondale perhaps being a bit more expected. Performance comparisons would depend on a detailed side-by-side test.

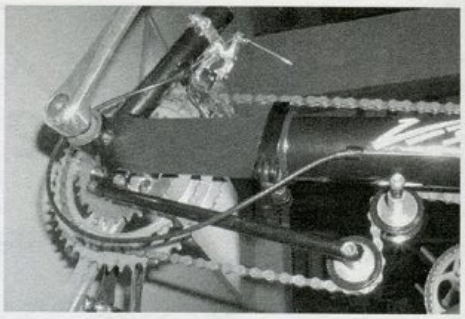
X-eyed Design—The other new line of recumbents generating a lot of excitement at the show was the Bacchetta line from X-eyed Design. The bikes are new, but the two principals in this company are recumbent veterans. Company President Mark Colliton has had a hand in the design of several commercial bikes, including the Rans V-Rex. Vice President John Schlitter is formerly of Rans. Their combined recumbent experience totals more than 30 years. Their third partner, Chairman and Chief Financial Officer Mark Swanson brings entrepreneurial business experience to the team, having successfully led four start-up companies prior to teaming up with X-eyed. Since the show, Mike Wilkerson, formerly of Rans, has also begun working for X-eyed.

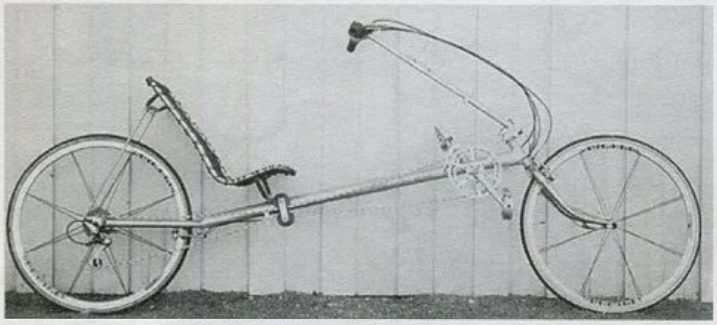
While the show was underway, a titanium Aerocycle appeared at the X-eyed booth, and the man behind that bike, Rich Pinto, was



Vision's 2002 R40—note elevated chainstays

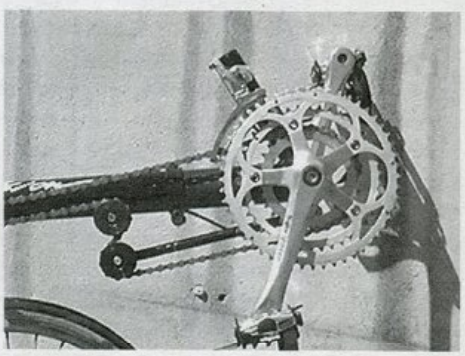
Turner Carbon LWB USS



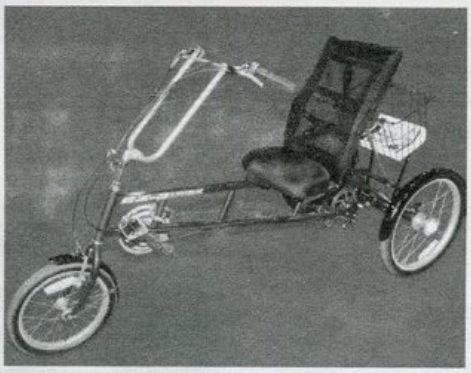


Rotator's dual 700c Pursuit

Upper Right and Right: Vision's new boom slider mechanism —John Riley



Jerome Hedinger and the "Wickster" SWB—John Riley



The new Sun EZ3 delta trike —John Riley

Vision's new dual 650c Saber —John Riley

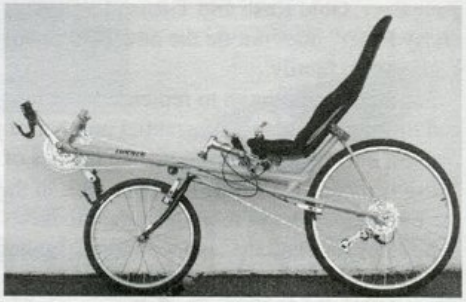
Lightning's P-38 SWB

Bacchetta Strada

Bacchetta Giro

BikeE RX XL

2002 BikeE CT with Comfort Seat



2002 Turner T-Lite

signed on to the team as well. Pinto will now produce this bike for X-eyed as the Bacchetta Aero. This bike has the same wheelbase and monotube frame design as the other Bacchetta bikes. The seat is a light weight European hard shell model from M5. Total bike weight is 21-pounds. Target price is in the $3,500-$3,600 range.

As designer and builder of the Aerocycle, Pinto has been an advocate of large wheels, a design philosophy that is not only reflected in his own designs, but in the design of the Bacchetta Strada as well. The larger wheels have less rolling resistance and the large front wheel raises the crank bracket and creates a more aerodynamic riding position.

There are more subtle aspects to the big wheel philosophy as well. The bike is intended to appeal to performance-oriented recumbent riders, and also potentially to the riders of conventional racing bikes. The larger wheels will give the bike a more familiar feel for the latter, and the higher position will enable them to continue to ride in groups of conventional bikes—something that can be difficult with lower recumbents, low racers in particular. Big wheel recumbents have been available in Europe for many years, but have been rare in North America.

Bacchetta means stick in Italian. The proper Italian pronunciation is *Ba-ket-ta*. In this case, the ch sound is like a hard k. The X-eyed people often say *ba-shet-ta*. Either pronounciation seems to be acceptable. The name is Bacchetta is a reference to the monotube frame of these bikes. Both The Strada and the Giro have a 47-inch wheelbase, which is relatively long for a SWB bike and is said to improve handling and ride. The Strada has two 26-inch (559) wheels. The Giro has a 26-inch (559) rear and a 20-inch (406) front wheel. The Giro will come in a small, standard and large sizes, and the Strada will come in standard and large sizes. These frame size differences are accomplished by changing the boom length, not the wheelbase. Both bikes weigh about 30-pounds. The frame is TIG welded CroMo, with the main tube being a custom formed in a teardrop shape. The narrow part points down. The shape prevents the DELRIN seat clamp from rotating.

The Bacchetta seat is similar to a Rans seat, but is different in several ways. It has a different pan, and the seat back has a forward curve at the top. This top curve is intended to hold the rider in position when the seat is reclined. The pan is bolted to the seat frame so the owner will have the option of changing to a smaller and lighter pan that is now in development. Chain management is via a single x-path idler (over/under) mounted to a stout support under the seat. It is intended that both bikes would be ridden with a fairly "arms out" position, but the riser is fully adjustable and has a top-loading clamp for the bars, allowing them to be set up as desired.

The Strada, priced at $1,700, has Shimano 105 triple chainring cranks, bottom bracket, and front and rear derailleurs, and a Shimano HG 50 9-speed cassette. Rear brake is an Avid Arch Rival V-type. The front brake will be a dual pivot, left entry sidepull that is now in development for both the Strada and Aero models. In the middle of the adjustment range, the seat height is said to be about 24-inches. The crank bracket height is 32-inches.

The Giro is Bacchetta's all around bike. The 20-inch front wheel lowers the seat height to about 23 inches in the middle of the adjustment range. The crank bracket is lowered to 27-inches. The Giro also has plenty of room for fat tires and fenders. The original plan was to price the Giro the same as the Strada, but after talking to dealers at the show, it was decided to re-spec with Shimano LX components. The new Giro target price is $1,495.

A short test ride on the Giro left the impression that even at this early stage, the bike felt more solid and dialed than some bikes do after years on the market. The bikes are designed from a particular point of view, so they may not be for everyone, but for those they suit, they should be quite good.

X-eyed is also marketing accessories under the name, X-cessories. Products include "hardware" items; a derailleur post light mount and underseat racks, and "software" items; a vest and jacket. These are made from reflective ILLUMINITE material except for the thin fleece back, which provides for ventilation.

Vision—The parent company has been busy expanding into other aspects of the bicycle business, but the recumbent line has gotten a lot of attention too.

The CLWB R32 and LWB R40 are gone, replaced by a medium wheelbase version of the R40. The crank bracket on this bike sits on top of the boom against the backside of the headtube. The R40 is available set-up as a MWB for $1220, or as a short wheelbase bike for $1095. The R40 is still convertible between the two formats, and either can be set-up with above or below seat steering. Components on either version of the R40 will be a Shimano Deore group, with TruVativ Elita cranks and Avid rim brakes.

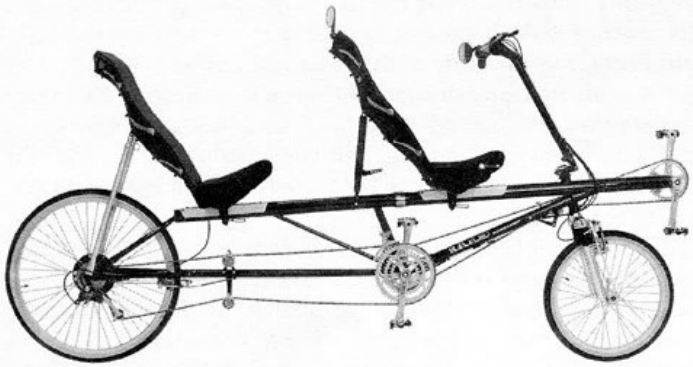
All Vision single recumbents now feature elevated chain stays and a straight mono tube frame made from "AirLight" 2-inch tubing. These changes increase torsional rigidity and improve chain clearance. The seat height is unchanged.

All Vision single bikes also have a new aluminum boom design that greatly simplifies fitting the bike to the rider's leg length. An idler attached to the frame and an idler attached to the boom automatically take up the chain as the boom is slid in and out. The boom itself is made from an extrusion with a notch on the top. This indexes with a tab on a collar that fits around the end of the frame to prevent the boom from rotating. The collar has a quick release. The collar and quick release replace the brazed-on pinch bolts that were used before.

This system will be a boon to dealers and owners wishing to adjust the bike for different riders. It will be standard on all single bikes, but can be removed if the owner does feel the need for the capability. The entire R60 Saber line has been redisigned to accept 650c (571) wheels and the rear wheels now use standard dishing. These changes allow for the use of a wide range of aftermarket aerodynamic

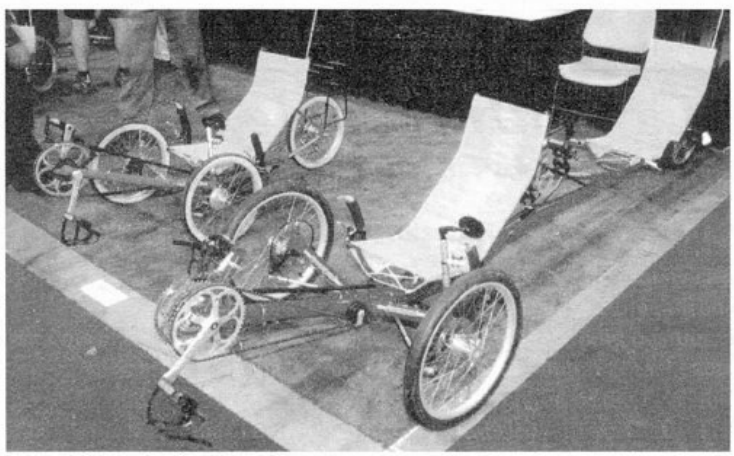
The TerraCycle TerraZa

2002 Giant Prodigy "Comfort Bike" with cast aluminum wheels, disc brakes, full suspension fenders, rack and SRAM Smart bar—John Riley.



RANS Screamer tandem

ICE Tandem trike



Greenspeed at Interbike—John Riley

wheelsets and improve tire availability. The main tube of the Saber frame is now straight, rather than angling down at the headset.

New Vision accessories include a kickstand adapter that takes a standard kickstand, a new chain guard, and a seat back bag that hold a water bag. Visions also is returning the "standalone" DayBag to the line-up, which fits all the bikes independent of the WaterBack.

Not recumbent, but the new V70/V72 Thoroughbred line is interesting nonetheless. These bikes are Vision's take on the conventional "comfort bike." The traditional riding position has been rotated back by 22 degrees. The wheelbase is stretched behind the bottom bracket and the seat is moved back. The headtube is lengthened and the handlebars are raised. These changes permit easier mounting and dismounting, allow the rider to remain on the seat with their feet on the ground at stops, and provide for a comfortable, upright riding position. Normally an upright riding position carries an aerodynamic penalty, but this is reduced by the fact that the seat is lower. Price range from $629.95-$849.95

BikeE—The BikeE E2 tandem now comes standard with Avid mechanical disk brakes with a 6 inch rotor in the front and an 8 inch rotor in the rear. It also now has a loop-style kickstand that attaches to both sides of the front fork. Prices and available sizes for the 2002 line are as follows: CT: S (standard size) and XL, $699. AT: small, S, XL and XXL $1229. RX (rear suspension): S, XL, and XXL, $1499. RX (full suspension): same, $1799. FX: S, XL, $1699. E2: S, $2499. (XL & XXL models are $50 more.)

RANS—The long-awaited non-slip seat mount, but it is only available on the V-Rex, Stratus, Velocity^2, and Screamer. These bikes also get tidier seat supports, top load risers, Wellgo LU 949 pedals, and disk brake mounts on both the front and rear.

The Stratus, Tailwind and Velocity Squared now all have a 1-1/8 inch headtube and riser bar. The Velocity Squared gets orange metallic paint job. New accessories from Rans include a chainguard and a new curved, semi-rigid seat back bag that includes a waterbag section. The Gliss has been discontinued "for now."

Burley—There are two new models for 2002, the Canto and Taiko, based on a single new frame design. The new design has a convertible wheelbase like the Limbo (LWB to SWB), but does not have the Limbo's rear suspension or curved-tube frame. The frame resembles, but is different from the Django/Hepcat design. The Canto and Taiko have a longer seat rail and come in one size only. They share a frame and fork, but the Taiko has upgraded component and an aluminum seat frame. The Canto will retail for $1,249 and th Taiko will be priced at $1,799.

All new Burley recumbents except the Limbo can now be fitted with seat supports. The tilt range on the Burley seat has been modified so the range is a bit more upright.

The Limbo now has two idlers. The front one pushes the chain down so it can now go over the top of the second idler. This brings the chainline closer to the suspension pivot, which should reduce pogo.

Lightning has deleted the pedal extenders, chain tube and chain disk from the Thunderbolt, and added an idler for chain managemen Also now standard is a tilting handlebar riser with quick release loc down. Retail price is $795. (Lightning proprietor Tim Brummer has been very successful racing a low bike in UCSF time trials. He has won his age class and might have set an age class record except for some unfavorable winds. His average speed in a 40 km trial was 28. mph.)

Sun/EZ—Gardner Martin of Easy Racers has been busy designin a new bike for Sun Bicycles/J & B Importers. The new LWB EZ Sport has a 26- inch rear wheel and a 20-inch front. The frame is CroMo steel. Price will be $899. Riding position is similar to the Tour Easy, but both the seat and bottom bracket are higher.

There is now also a trike version of the EZ1, the EZ3. A trike axle has been added to the rear. Price will be $750. The EZ1 cont-inues, and is priced at $529. The aluminum EZ1 Lite is $750. Also on display at the Sun/J&B booth was a kit that will link two EZ1 bikes

side by side to form a quad tandem.

Europeans—The European bikes, including low racers, continue to make inroads in North America, but only Hase and HP Velotechnic had booths at the show. HP Velotechnic now offers a Rohloff hub gear option on both the Street Machine and Speed Machine. Two "speedbags" (rear fairings) are now available for the Speed Machine. One has a large opening and is designed for touring. The sleeker carbon fiber race fairing is integrated into the seat back and weighs less than four pounds. It has only a small opening for cargo.

The Speed Machine now has optional handlebars that sit farther way from the rider and make it easier to get on and off the bike.

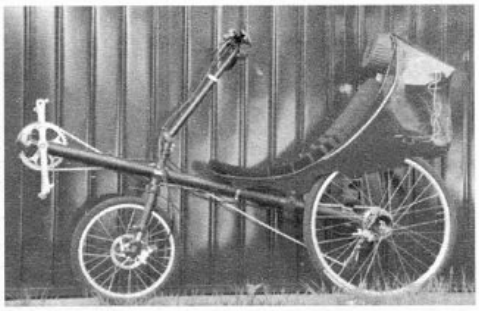
Cycle Genius—This new company was at the show with prototypes last year. This year they had the production versions. The biggest difference was that rather than having a RANS seat, these bikes now have a new, unique seat design of their own. The designers of these bikes live in Houston, Texas, a place where they know something about humidity. Perhaps that had something to do with their design being entirely mesh. Beneath the mesh, there are chrome plated serpentine springs such as one might find below the surface of an upholstered chair. These add a bit of suspension to the seat, and are easily removable. The seat back is adjustable for tilt, and can be folded down for transport.

The CG24S has a steel frame and sells for $550. The bike has a SRAM 3.0/5.0 component mix. The CG24AL has an aluminum frame, double wall rims, 100 psi tires and higher gears. The price will be $700.

Wicks Aircraft—The Trimuter tadpole trike with 20 inch (406) wheels for $3,093. Wicks also offers a SWB bike in three different trim levels. The bike started out as a Turner design, but has had several refinements and modifications. All bikes feature a 20-inch (406mm) front wheel and a 700c (622mm) rear wheel. The seat is carbon fiber with a pad that includes a Temper foam section in the lumbar area. Brakes are Magura disk brakes.

The Wicks SWB USS models all bear a striking resemblance to Turner SWB. In fact, they are designed by Turner, and upgraded by built for Wicks. Jerome Hedinger had this to say, "All three models have 406 bead front wheels. The seat is carbon fiber with a pad that includes a Temper foam section in the lumbar area. The angle of the main tube forward has changed to allow the lowest placement of the bottom bracket and still provide an unobstructed path for the drive side of the change except on the smallest of the three change rings and the small cog in the back. There are no flattened tubes used in our frame and we use a custom built front fork for the disc brake. We use a small bend on the lower end of the fork to increase the

The Vision R50 suspended SWB

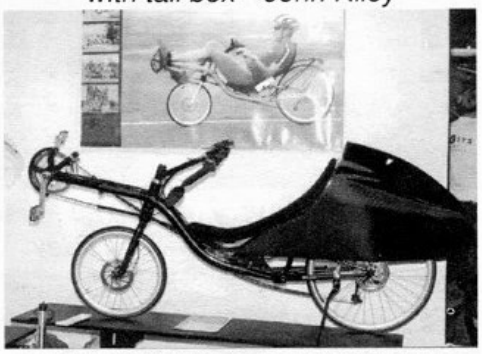


The Burrows Ratcatcher 9

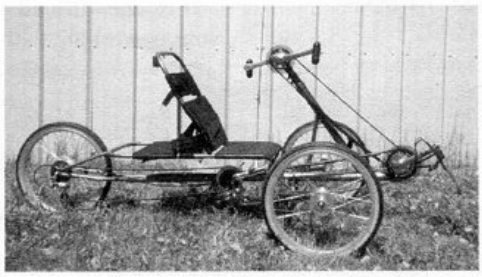
The Rans Rocket

The HP Velo Street Machine with tail box—John Riley

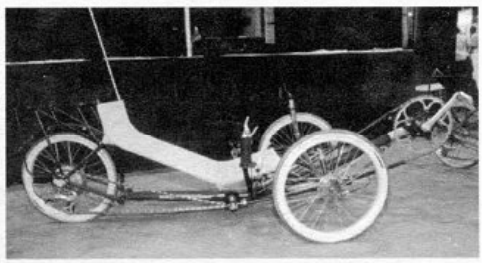
The RANS V-Rex

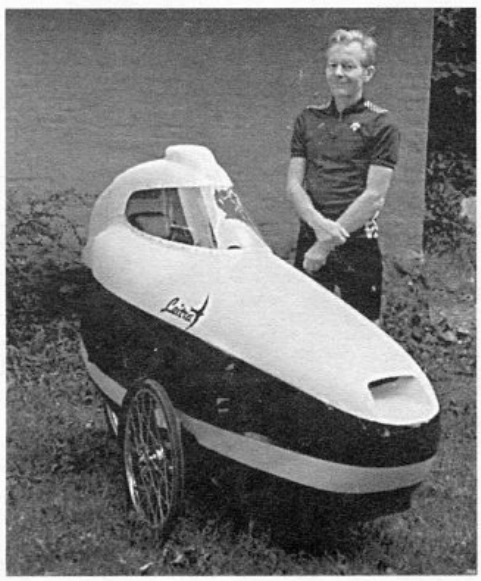


ABOVE:HP Velo Speed Machine BELOW: Greenspeed GLX —John Riley



Angletech QuadraPed

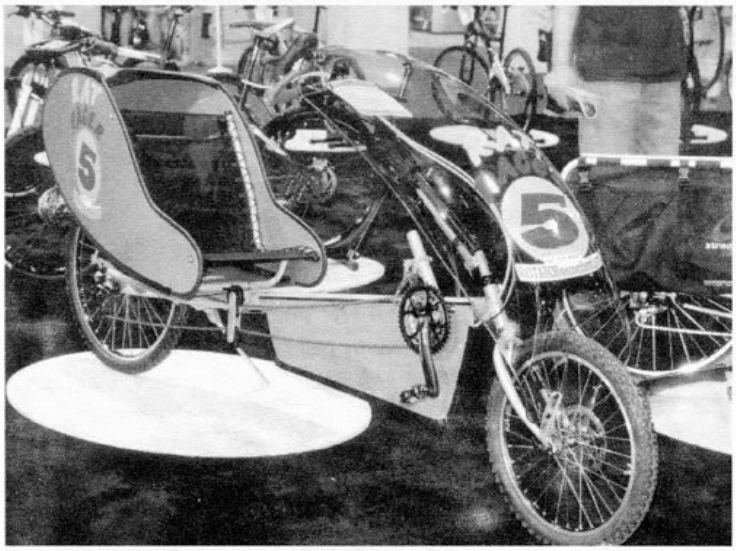




Leitra Velomobile

Penninger at Interbike

The ICE Micro trike—note the Euro seat



Rotator's very cool 26/20 Pursuit show bike —John Riley

Yellowbikes' Optima Lynx

The Lightfoot LWB remote steered Saluki

rake which vastly improves the neutrality of the steering. We also integrate attach points on the frame for the seat which also cleans up the overall look of the frame. We use a sliding boom for the crankset on all our bikes and trikes to provide adjustment for different rider sizes. We use a large 700c rear wheel to provide high end gear inches and we have pulled the wheel under the seat as far as we can to achieve a very balanced center-of-gravity. The bike is very stable in high speed descents showing no signs of instability and there is also no sign of flex in the frame and seat when climbing which makes the bike a very good climber. The frames are built in Southern Illinois by an aircraft frame fabricator. The bikes are painted and assembled here."

The Wickster has mostly Shimano 105 components and sells for $2,435. The JT Cruiser has mostly Shimano Ultegra comp-onents and sells for $2,940. The Hed-Turner has mostly Shimano Dura Ace components, features carbon HED wheels, and sells for $3,827.

Greenspeed—The Greenspeed trike line consists of about six basic models, but as always with this company, options and innovations abound. Proprietor Ian Sims observed that some people were touring on the very laid back GLR race trike, so he developed the GTX, a sport version of the race trike. The steering linkage is above the frame for better ground clearance and the seat back angle is 25 degrees, vs. 20 degrees on the race trike. This trike has 16 inch (349mm) wheels all around and comes standard with Schlumpf Mountain Drive—a crank bracket mounted two speed planetary gear system that solves the gearing problems of the small drive wheel.

The GTX is shorter than the GLR, and is quite small overall. It meets a demand for a trike that fits in smaller spaces and is easier to transport. It reportedly can simply be placed in a placed in a soft bag and transported by plane without any disassembly.

Sims explained the attraction to small wheels, especially for a trike like the GTX. A smaller rear wheel means the trike can be shorter. Smaller front wheels mean the trike can be narrower because less clearance is required for steering. Small wheels are lighter and stronger and can stand up better to side loads.

It can be difficult to mount and remove tires from smaller wheels. Sims is working with Velocity (and Velocity had one of these at their booth) on a 16 inch "Sims rim" that has a deeper well that will ease tire mounting. Since he uses drum or disk brakes on all his trikes, this rim has a curved sidewall and no braking surface. Sims has also developed a narrow drum-braked hub. It is aluminum with a hard nickel coating. The backing plate and works are from a SRAM hub brake.

The other new trike in the booth was the GTV Tandem/Solo trike. As its name implies, this trike can be built up as a tandem, or a middle section can be removed and it can be assembled as a single. On the Interbike demo trike, the front seat and middle section are in one piece. They are removed by way of two S&S couplings and two seat bolts, so that the rear seat then becomes the solo seat as the two ends are joined back together. A section of the main drive chain is removed using quick release links, and two lengths of gear cable are removed using quick release cable joiners.

The popular Greenspeed GTO now has a TIG welded frame that is made for Greenspeed in Taiwan. The frame is painted and assembled in Australia. Zach Kaplan had this to say about the new Taiwan frames, "I brought the Taiwanese demo GTO back from Interbike. The frame really does look more refined compared to the Australian built Greenspeeds I have here."

Trike News—In other news for tadpole trike drivers, Mark Mueller's Windwrap fairings can now be had with a Flip-It option that allows the fairing to swing forward for easy access to the cockpit. The T-bar riser incorporates a RANS Flip It stem. It is available for his three different frame mounting systems, the Classic, OnePoint, and Remote. Mueller also has fairings for LWB USS recumbents and is working on a body sock for the V2.

Other trike flavors were also present at the show. The **Sidewinder** trike is a rear-steered tadpole design. The front wheels are driven

through a differential. Braking is by way of dual inboard hydraulic disk brakes. The trike can be disassembled for transport or storage. Price is $2495.

The German company **Hase Spezialraeder** was one of two companies exhibiting delta trikes. Hase has continued to refine their KettWiesel and Lepus designs. The KettWiesel gets a new seat/handlebar mount and very stout aluminum fender mounts. The KettWiesel only has nine speeds, but a Schlumpf crank bracket gear is an option. The single chainring crankset is a unique style that was originally being fitted to Mercedes-Benz bikes. The KettWiesel retails in the US for $2,295.

The Lepus now comes standard with 20 inch (406) wheels and a heavier elastomer in the rear suspension. This trike now has a slightly smaller folded size. Price is $3,295.

The **Penninger** Voyager and Traveler are American made delta trikes. These trikes have a jackshaft under the seat that allows for 64-speed gearing. The Traveler has a full sling seat and sells for $2,495. The Voyager has a more conventional seat with a padded base and a mesh back. It sells for $2,795. Both the Penninger and Hase KettWiesel trikes can be linked as tandems by removing the front wheel of the following trike and attaching the fork to an optional bracket on the leading trike.

The **Quetzal** recumbents from Procycle in Quebec surfaced again, this time with a whole new line. The aluminum Paraiso Exotico (price $1,499) is pretty much the original Quetzal design. The C-105 ($899) is a steel version. The Misterio ($799) is a similar bike with a steel square tube frame and suspension. These bikes all have the Quetzal seat with the upright back and the air bladders under the mesh for cushioning. The Triciclo ($799) is a fairly tall delta trike that bears some resemblance to the late ReTrike.

The new line consists of an entire family of semi-recumbent bikes to fit a range of sizes and ages. They have a conventional bike seat and a small back rest. Prices range from $209-$369. The ZEM four wheelers from Germany came in four person and two person styles. These seem intended for the rental market.

Though not at the show, **Windcheetah** will be offering a kit version of their Clubsport trike frame. The kit is a 93-piece bond it yourself set of castings, tubes and machined parts. According to Bob Dixon, "It is aimed at enthusiasts who have good mechanical skills and a degree of common sense." The kit will cost around $1800.

Barcroft—Some recumbent builders did not have booths at the show, but were seen on the show floor and commented about their lines. Bill Cook says the Barcroft frames are now being made by Stephen Delaire. Painting is now being done by Northeast Custom Paint Works, and Cook is very pleased with the results.

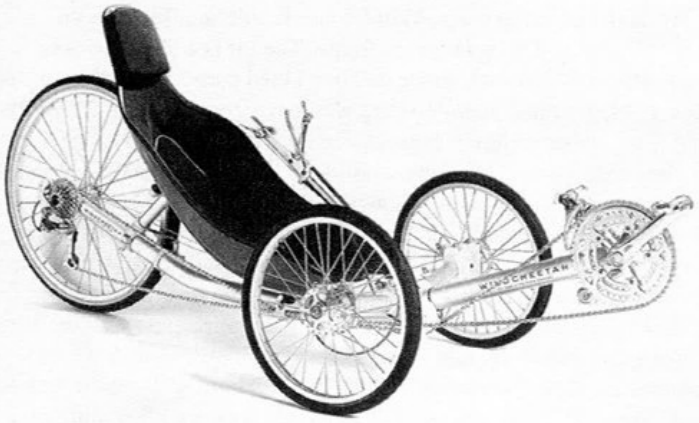
A new model, the Dakota S, will have an tunable Action-Tec front suspension unit in the head tube. It also will come with Avid mechanical disk brakes and Vredestein S-lick tires. Both the Dakota and Virginia GT models are now available with a sliding aluminum boom, to accommodate a broader range of riders. The sliding boom is an extra-cost option on these bikes.

A Mueller Windwrap fairing will be available for the Dakota and Virginia GT models. The Barcroft Columbia tandem can now be equipped with the Action-Tec fork, SRAM 3x9 DualDrive, and mechanical Avid disk brakes.

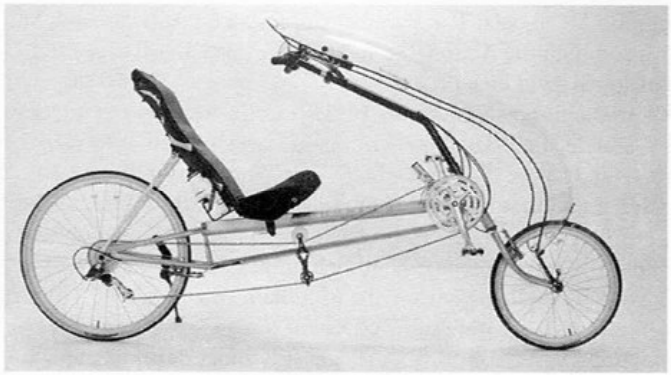
A production version of the FWD Barcroft Oregon low racer will be available soon. The bike will feature wheels with lightweight American Classic disk brake hubs, mechanical Avid disc brakes, custom aluminum Barcroft front-wheel-drive forks, optional Garrie Hill carbon fiber wheel covers and carbon fiber seat, and optional gearing with a custom left-hand Schlumpf drive, or SRAM 3x9.

Crank-It—The makers of the Mountain Quad and Scorpion trike say they have sold out their first run of quads, but now need to find a new production facility. The trike is still under developement.

Longbikes—Owner Greg Peek says the Slipstream will now have a bolt-on rear triangle. The Eliminator has a different bolt-on rear triangle. Both bikes will also have bolt-on rear dropouts to allow a choice between 26-inch (559) and 700c (622) rear wheels. There will be a new two-piece seat which will allow interchangeable seat bases. The seat back angle will be adjustable in 5 degree increments.



The Windcheetah trike



The RANS V2

The new $550 Cycle Genius CLWB—John Riley

The new $899 Sun EZ Sport (available in Feb. 2002) —John Riley

MicWic—Robert Tennant, designer of the British made MicWic line, says he intends to have the MicWic back-to-back tandem produced in Michigan beginning in February. This bike has two 20-inch (406) wheels. Both the front and rear crank brackets extend beyond the wheels, so it appears a bit like the front sections of two SWB bikes have been joined back-to-back. The bike will have high end components, of British manufacture when available, including Middleburn cranks and Hope disk brakes. The price will be about $5,000 for the base model. A titanium version may also be available

Tennant also runs a recumbent touring company in the UK called Britain B-cycle. Recumbent singles and tandems from MicWic and Linear are available, as are conventional bikes. The tours are in Wiltshire and the Cotswolds.

COMPONENT NEWS

Components and accessories of possible interest to recumbent riders include the new SRAM DualDrive hub. This rear hub combines three internal gears with eight or nine derailleur gears and offers one hand shifting. The click box that attaches to the rear hub has a new easy-to-adjust and remove design. Shifting effort is reduced and the hub gears can now be shifted under load.

Crank Brothers new "Egg Beater" pedals have been hailed by one of the glossy magazines as the world's best off-road pedal. The four sided pedal is aptly named—it really does resemble an egg beater. Some of the features that make it attractive to off-road riders may also be of interest to recumbent riders. It is claimed to offer easier entry and release with a variable release angle and six degrees of float. It has only 13-parts, three of which are O rings. Contact area is said to be as large or larger than most other pedals and stack height (15.2mm) is said to be lower. Since spring tension is not what holds the cleat in on this pedal, it is not adjustable. The pedals are rebuildable. Weight is 283-grams per pair. The cleats fit shoes with an SPD hole pattern.

The Twist and Sip water bottle holder mounts to conventional holes, but allows the cage to rotate side to side. This could make water bottle use much easier for those who use mounts on the back of the seat. Schwalbe has introduced a 20-inch (28-406) version of their Stelvio high performance tire. It is claimed to have the lowest rolling resistance of any tire in this size, even though it has a Kevlar belt. Rated pressure is 120 psi.

Semi-tubless tires in both 20-inch sizes (451 and 406) are available from Knucklebone. These tires come with Slime tire sealant already injected into the built-in air bladder. They come in 110 and 80 psi ratings and work with standard rims.

The Pantour front suspension hub only offers 10 mm of suspension travel, but the hub is not much bigger than a regular hub. It is available for 20, 28, or 32 spokes. Unfortunately it requires a rim with a minimum braking surface of 12mm.

Final thoughts, assuming people will still be buying and riding recumbents in the post September 11 world: Strictly speaking, there is not necessarily much new about the Bacchetta Strada. The Dutch have had big wheel SWB bikes for many years. Nowadays, the Dutch use big wheel bikes for touring and low racers for going fast.

The low racers have been coming on with the go-fast crowd in North America. It will be very interesting to see how things sort out between this new big-wheel bike and the low racers. Low racers work for the Dutch because they often find themselves racing and riding in very flat, windy conditions The riding conditions are much more varied in North America, especially on the East and West coasts, Florida not withstanding. Will fast riders choose the Strada and Aero over low racers? Time will tell.

The Cannondale Easy Rider seems to be a good one of what it is. But is there a market for a $2,000 CLWB bike that is not particularly "hard core" in any way? It is not likely to be the first choice for either fast riding or a long tour. It would be great for commuting, recreational riding, and light touring, but will people pay that much for a bike to be used in these ways? Time will tell. ◆

How to choose *your* perfect recumbent; a World View

By Stuart Dennison, London, England

Anyone contemplating buying a recumbent is faced with a problem. Without any experience of riding one, how on earth are they to know what is right for them, or even what questions to ask? Luckily, recumbent designs tend to come in standard combinations, the first step is to decide what kind of riding you are likely to do and which configuration is likely to suit you best. This should narrow down your choice enough for you to be able to compare two or three different models on the basis of build quality and design details.

Most aspects of recumbent design are determined by six basic design elements:

SEAT/PEDAL HEIGHT RATIO

Pedals higher than the seat allow a more aerodynamic riding position and encourage you to spin rather than push the cranks. They also permit a more laid back seat, which helps distribute your weight and take pressure off your backside. Essentially you end up with a more efficient bike that is more comfortable for longer distances. Pedals lower than the seat make it easy to get on and off and, in the case of bikes (instead of trikes), easier to learn to balance on; ideal for beginners. The higher seat enables a more stable ride and the bike is easier to control at lower speeds—perfect for easy riding and commuting in stop and go traffic.

SEAT HEIGHT

Higher seats are easier to get in and out of, lower seats tend to give a more sporty riding position and better aerodynamics. With bikes, you need to choose a model that allows you to touch the ground easily, although visibility in traffic might also be considered an issue. Getting the seat low is a design challenge, especially with under-seat steering, as there can be problems with chain clearance (chain management). With a trike, a low seat gives a low center-of-gravity, which helps handling. With both low rider bikes, and ground hugging trikes with well laid-back seats, visibility of the machine in traffic can be a problem.

SEAT TYPE: HAMMOCK (MESH), MOULDED OR COMBINATION

Seat type will determine the frame design, ease of getting on and off the bike, and overall height of the seat. Hammock (mesh) designs consist of a frame with either webbing or mesh stretched between the sides. They can be very comfortable and well ventilated but tend to be more difficult to get in and out of, especially for shorter riders and when they are higher above the ground (tall SWB bikes). The seat frame needs to be wide enough to support your weight. Mesh covers can also be prone to move around and may need to be tightened or relaced occasionally.

Most Dutch and German bikes use a moulded hard-shell design (Euro-seat) in combination with a nylon mesh mattress pad, which helps with cooling and ventilation as well as providing some padding. This seat simplifies the design of the bike or trike frame, and is far less likely to need adjustment or repairs.

Combination seats have some of the advantages of both designs; a mesh back for coolness and suspension, and a moulded base for ease of access. This makes them a good choice for everyday bikes. Both moulded and combination seats allow you to put your legs at either side, which permits a higher riding position and more comfortable starting and stopping. For long rides it is very important to be able to lay the seat right back in order to take pressure off the backside. This is a position which may take some getting used to in terms of handling, so it helps if the seat is adjustable. You can start with a more upright position, then gradually recline the seat farther back.

WHEEL SIZE

Wheel size both determines and is affected by seat height, wheelbase (distance between front and back wheels) and the gearing system. A low bike with a big back wheel can be very long, whereas a higher bike can be more compact. Standardizing on two 20-inch wheels (406mm) is nice from the point of view of convenience and the range of rims and tires available. Small wheel recumbents benefit more from suspension to help the bike roll smoothly over road hazards. You also need to have a gear system that will increase the gear ratio adequately, either large chainrings, a hub gear system such as the Sachs 3x7 (now SRAM DualDrive 3x8/9), or some sort of intermediate transmission, all of which add weight and complication. An even smaller front wheel allows a lower seat and pedal height (bottom bracket) without causing the chain to interfere with the front forks. Compact long wheelbase bikes such as the BikeE need to have quite a small front wheel to clear the pedals while keeping the overall length to a minimum.

HANDLEBAR TYPE/POSITION

The types are: under-seat, direct or indirect, and above seat, direct, fixed or pivoting. Handlebar type makes less difference to the overall design and ride of a bike than most people assume. In fact ,it is more or less determined by other issues, such as clearance between the seat and the chain.

Under-seat handlebars with indirect linkages to the forks operate smoothly but can make adjustments to the seat rather complicated. They are also very vulnerable in the case of a fall, as either the bars, the pivot point or the linkage bar will tend to bend; something to keep in mind if you are a beginner or you expect other people to ride your bike.

Under-seat handlebars directly attached to the forks are simple and strong but can require large movements in order to make a sharp turn leading to you banging your hand on your leg.

Above seat handlebars are simple and positive but need to have enough adjustment to give clearance between your knees and the bars. Pivoting models make it easier to get in and out and bring the bars closer to your chest to clear your knees when riding. Handlebars above the seat also give you a convenient place to mount a front light, mirror, computer and other gadgets.

The issue of comfort is largely personal. Under-seat handlebars allow your arms to dangle and the chest to open fully, and are more often used on touring recumbents. Above-seat handlebars bring the hands and arms into a more aerodynamic position, and are more often used on racing and fast day ride models.

SUSPENSION

On a recumbent the suspension is isolated from the pedaling action and is therefore entirely beneficial. Not only that, but if you are lying quite flat over the back wheel, you will need something to reduce the impact of shocks from bumps and potholes. Most bikes with 20-inch (406mm) front wheels can be fitted with front suspension, improving both speed and comfort. Quite a few bikes now come with a rear swing arm suspension, which pushes the price up, but greatly improves the comfort and performance. Long wheelbase models benefit less from suspension as there is less weight on the front wheel and rear bumps impact less on the rider.

PUTTING IT ALL TOGETHER

Choosing a recumbent depends on the kind of riding you want to do, and your level of experience. In general, for commuting and around town use, and beginning riders, bikes with a high, upright seat and a low pedal height are best. For touring and fast day rides, or more experienced riders, bikes with a laid back seat and a high pedal height (bottom bracket) are best. For flat-out racing, a lowrider design leads the pack.

Just as with upright bikes, there are variations with design types of recumbents. Some models are stable and certain, others are twitchy and responsive. At this level, you need to try machines for yourself, to find what you like best. ◆

Stuart Dennis of Bikefix in central London, England writes this unique world view recumbent primer. We were so impressed with it in its original printing in the "Human Powered Vehicle World Championships 2001" program, we obtained reprint rights.

The Easy Racer TiRush

American LWB Born in the USA

by Bob Bryant

A recumbent style that is distinctive to the USA and Canada is the Long wheelbase above-seat steering (ASS) "Easy Rider" style of recumbent. I have long been of fan of this design. Having ridden SWB and LWB USS's for my first recumbent rides, the one I bought had to be a LWB ASS. Now 15 years later—the LWB ASS with the low bottom bracket is still what I and many other riders prefer. Possibly the most loyal following of any recumbent style on earth are the members /readers of Connie McAyeal's and Laurie Smith's (mother and daughter) *Easy Rider Recumbent Club Newsletter* which enthusiastically covers LWB ASS (mainly Easy Racers).

So what makes these bikes so special? It comes down to the following aspects of this bike and design:

1. **Performance**: Few recumbents will outperform a LWB ASS with a Lexan front fairing. This is not extreme performance—this is user-friendly performance for nearly any rider.
2. **Ergonomics**: Low seat + upright position + multiple frame sizes + ape hanger handlebars (like your childhood "Stingray").
3. **Style**: LWB ASS have a Harley-like image with high resale. Owners feel like they are part of an exclusive club.
4. **Classic Tradition**: Most of the LWB ASS builders have been around for years, The products are refined, and most builders have excellent reputations.

This style of recumbent is *not* popular worldwide most likely because they are long and large and more difficult to haul/store. Though we have respect for all of the world's recumbent styles, the LWB ASS is truly an American style of recumbent. ◆

Recumbent Selection 101

By Bob Bryant

Selecting a recumbent bicycle can be more complex than for traditional upright bicycles. The reason for this is that recumbent designs vary more dramatically than do uprights and they can be more difficult to find and test ride. Recumbent bicycles can have wheelbases of 40-70-inches and seat heights of 8-31-inches off the ground. And then there are those handlebars: under-seat (USS) with handles facing rearward, forward at an angle or with sidesticks; above-seat (ASS) with long tiller bars or a folding stem riser; and even a joystick pivoting on an automotive style U-joint. It is our job here is to try to help you understand a bit more about recumbent bicycles and the selection process.

Your first task is to answer these basic questions:

What is your budget?: Entry level recumbents start at $550. A decent enthusiast recumbent can be $1200-$2500. If you are a cross country tourist or hard-core year around commuter, buy a really GOOD bike. You get what you pay for. Recumbents are expensive because they use custom tube sets, more proprietary parts and seats that are much more expensive.

Your ability: are you looking for a bike trail cruiser, weekend sport bike, a loaded tourist, a heavy duty commuter a racer to blow away all of your recumbent pals on weekend rides?

Your Athletic prowess: How far and how fast do you plan to ride? Do you where Lycra? Will you use clipless pedals? How extreme (laid back seat + high pedal position) of a riding position can you handle? If not you may want to consider a more casual low pedal height model.

Trike or bike? Would you want two wheels or three? Trikes are cool, but expensive and more difficult to find and test ride.

Type of terrain: Will you ride on-road, off-road, rough roads or smooth roads. Should you consider suspension? Suspension is great, but adds cost, complexity and makes adding accessories (fenders, racks, bags) more difficult and suspension can detract from overall performance.

Size of bike: Hauling by car and storage; SWB are the easiest to haul; standard size CLWB are second; USS models are more difficult. LWB and trikes are the most difficult. Fairings must be removed on bikes that are fit on roof or bumper racks.

Speed: Is going fast your mission? If so, buy a *known* fast recumbent that fits your body, riding style and where you ride. Do not just buy a bike that the manufacturer says is high "performance."

DESIGN PREFERENCES

Your next step is to make a list of bikes that really grab your attention—designs that appeal to you. This seems so simple, but some tend to overlook this task. There are more considerations:

Steering: Would you prefer above-seat (ASS) or under-seat steering (USS)?

Above seat steering is more common (normal), user-friendly and aerodynamic than under-seat steering (USS). ASS offers improved performance due to the decreased frontal area and ability to accept a front fairing (mainly LWB). RCN readers prefer ASS 2:1 over USS. Note: ASS is also known as OSS (over-seat steering).

Under-seat steering is considered more comfortable by many riders, though can take more time to become accustomed to. USS is often heavier and more complex, usually requiring steering linkage and other additional parts. In most cases, USS does not perform as well due to increased frontal area. There are a few LWB ASS models with linkage above-seat steering.

Pedal height: Would you prefer to have your feet high or low? The varying pedal heights have their pros anc cons:

Low pedal height is the natural, more normal and most user-friendly position for the pedals. If the seat is too far reclined, this can suck all of the power out of the position. If the seat is tc upright, this can make for "recumbent butt."

Moderate pedal height is the neutral pedal position at seat heig (or just below) is very popular for all around use. Some riders st experience toe/foot numbness. A long test ride will be worthwhi

High pedal heights on SWB, lowracers or highracers can be ve aerodynamic and fast. Not all riders adapt to this more extreme riding position. This can make stops and starts more difficult. Moderate and higher pedal heights almost require clipless pedal Very reclined seats can cause neck fatigue; Very closed position can compress your gut, so they are best for riders with a more athletic build (skinny). Some riders experience toe and or foot numbness. We believe that this is approximately 10% of recumbent riders.

Low seats with high pedal heights are mainly designed for racing. A few hearty souls ride them on the road. They are difficult for traffic to see, more difficult for you to see traffic (especially behind you), more vulnerable, and more difficult to control in an emergency. Some front-wheel drive (FWD) model can lose traction on wet or imperfect pavement.

Seat height: Most all recumbents have lower seat heights than d uprights. Many recumbents are still too tall for some riders. Full mesh seats make bikes even more difficult to hold up at a stop. Be sure you can comfortably hold a bike up at a stop or in an emergen situation.

COMFORT

Ultimate comfort is in the backside of the beholder. We'll discuss a few different types of recumbent comfort:

Seat types: These include comfortable full mesh (hammock styl seats, moulded shells (some with foam covers, Euro moulded shell (accentuated lumbar) and the combination (mesh back moulded base). Mesh seats and combinations are known to be the most comfortable, however, pedal angle, position and recline all are equally as important.

Seat recline: Every rider has the magic position that feels really good to their body. Being able to adjust the seat back recline angle can be an important aspect of this.

Body position: Some riders prefer a relatively upright seat with low pedal height. Others prefer an upright seat back with a high pedal height; Yet still others prefer a very reclined seat and higher pedal height; yet others like to be really laid back with feet very high up. Each type has their advocates. New riders should not buy laid back, high pedal model as their first recumbent. The more extreme the position, the more advanced it is and the longer it take to get acclimated.

WHERE DO YOU RIDE?

Your next task is to decide where you plan to ride your new recumbent. Recumbents can be suited for the following types of terrain:

- ✔ Recreational/bike path/neighborhood < 10 mile rides
- ✔ On road > 10 mile rides
- ✔ Long distance/loaded touring
- ✔ Off-road/unpaved roads

Recreational/bike path/neighborhood < 10 miles: For the new recumbent rider, the best place to start is the compact long wheelbase (CLWB) recumbent. They have compact wheelbases, above-seat steering and they are the best values in the recumbent world. They are basically scaled down versions of the venerable LWB ASS touring recumbent (considered an even first better choice by many).

New recumbent riders need to think very carefully about just how serious they are about recumbent bicycle riding. Consider you budget, and what kind of gear that you plan to wear. If you do not plan to use clipless pedals, consider a low pedal height recumbent. Examples: Sun EZ1, EZ Sport, EZ3, Easy Racer Tour Easy, Longbikes Slipstream, RANS Stratus and Lightfoot LWB).

On road > 10 miles: This is the recumbent bicycle enthusiast. The good news is that you can ride any type of recumbent, even CLWB (they can be used for anything, though they are not the fastest recumbents). However, when your mileage starts to climb, and if you are riding with a bike club or with a group of uprights, performance can take on a whole new meaning.

A good portion of enthusiasts choose a variation of the SWB theme (SWB, Euro-SWB, SWB-lowracer or SWB highracer). The reason is probably due to size of the bike, weight (the only really lightweight recumbents) and athletic riding position.

SWB can be more difficult to design (due to proper chainline, chain-management, weight distribution, pedal height, seat height and front wheel/heel interference). This can lead to design compromises, such as: heel interference (with the front wheel), they can be tall, heavily loaded front end or lightly loaded rear end, and they are more difficult to start or stop and clip in/clip out of clipless pedals (and they do need them).

Trikes are have similar ergonomics to SWB recumbents, however, on one hand they can be safer due to the third wheel: no clipless pedal clip-in pedal problems, and no balance concerns. The down-side is that some trikes are very low and can be difficult for motorists to see in traffic.

The LWB above-seat steering recumbent with a Lexan front fairing is truly the performance bike for common folks. They can be noticeably faster than a generic SWB or CLWB and are very easy to ride. Some riders just like to keep things simple and stay with a CLWB. Many are used for commuting and touring.

Long distance road/loaded touring: Historically, self-contained solo touring recumbents have been robust triangulated LWB recumbents capable of front and rear racks and/or towing a trailer. These days, the term "touring" has been generified to include anything that isn't racing. So, keep this in mind. If you plan to day tour, you can ride any kind of recumbent that you like. If you plan to tour, you need a robust touring bike that won't twist and wobble on you when you are going down a mountain pass at 50 mph with heavy load of camping gear. In other words, steer clear of ultra light, skinny tire, "sport touring" recumbents. Ask about availability of racks, fenders and trailer hitches. Ask about clearance for fatter tires. Ask about bike weight limits, even on suspended recumbents, as you must add your weight to the load limit to see if you will be within the manufacturers limitations.

COMMUTERS

Any type of recumbent can be used to commute. For intense urban riding a more upright position and low pedal height make the most sense. For durability, you either want very tough componentry or plan to repair/replace the entry level parts over time. Cheap entry level models (and some much more expensive models) were not made for daily intense commuter use. You need a bike that is known TOUGH and DURABLE.

If you are building a top quality commuter, start with a known durable frame, perhaps a triangulated CroMo frame of a proven long running design, have some hand built wheels with high quality cartridge sealed bearing hubs, headset and bottom bracket, and high quality user-serviceable brakes. For more info, see our component section.

OFF-ROAD

Most recumbents can be ridden off-road on trails or fire roads. The only production off-road recumbent is a CLWB ASS. We have found the CLWB and LWB ASS to perform best off-road due to the lower pedal height. This is especially true in wet/damp areas. Some riders have had good luck with SWB full suspension models. Be sure to note the heel/front wheel interference during low speed maneuvers.

RECUMBENT DEALERS

Not all recumbents are created equal. Carefully select your dealer. Despite the fact that most are knowledgable and helpful, they do have a mission—TO SELL YOU A BIKE. And it is usually one of the brands that they sell or stock. They don't get paid until you buy a bike from them. We strongly suggest that you patronize your local recumbent specialist. However, take responsibility for your own recumbent education and ultimate decision on what to buy. Beware of dealers who may only sell one or two brands or models—unless they are offering good deals on closeouts.

Check out specialists in the type of bike you are looking for. RCN is a good place to start. Most of the advertising dealers are serious regional recumbent experts with lots of experience in selling long distance (though some more than others). The larger manufac-

NEW RIDER ERGONOMIC TIPS

Most recumbents are built for average height (mid 5' range) and average weight riders; if you are short, tall, heavy, have unique proportions, or any health related problems, consider the following:

- ✔ **Neck pain**: If you have neck problems, stay away from bikes with very reclined seats.
- ✔ **Shoulder pain**: If you have shoulder, neck or arthritis problems, stay away from models with a long reach to the handlebars.
- ✔ **Backside pain**: If you have tailbone or bottom problems, stay away from very upright seats.
- ✔ **Shorter riders**: Check out models that come in multiple frame sizes. Low LWB, trikes, and SWB (with 16-inch front wheels) and some CLWB (high seats, cut away seat bases). Your best bet is the low seat SWB/LWB.
- ✔ **Taller riders**: Check out models that come in sizes ONLY: Longer SWB, trikes, CLWB XL & XXL models, and custom LWB sizes.
- ✔ **Heavier riders**: Stay away from models that have heavily loaded front or rear ends (CLWB, some LWB or some SWB USS). Check out models that come in frame sizes. Look for triangulated CroMo frames, 26 or 20-inch wheel combos and low pedal heights with more moderate or open riding positions. Look for fully triangulated frames and ask about warranties. Keep in mind that most recumbent suspensions are best suited for riders in the <200 pound range. Those requiring air pressure can be a hassle to work with as they require 110%+ the weight of the rider in the air shock. This can be a sure prescription for pogo (pedal induced suspension movement). ◆

turer websites are another place to find dealer lists for your town.

Especially important in the long distance sale will be preassembly and/or a bench or road test prior to shipping. If you buy a bike mail order that has never been set up, expect headaches in getting your new bike road ready. Most manufacturers don't preassemble, bench or road test bikes before they go out. Some recumbent specialty dealers do, and this is a service worth paying for. Find out who specializes in what you are looking for and deal with them.

RECUMBENT MANUFACTURERS

Not all manufacturers are created equal. It is fairly easy to find out who has the good reputation and who does not. Some small companies are often under capitalized, often having shorter warranties —and varying methods of dealing with warranty problems and response times. A great dealer is your best bet. The best manufacturers are well known in recumbent circles. Many can be found in our Editor's Choice awards (though some bikes are given awards for exceptional value and may not have the best customer service, etc.).

Get a recumbent education. Local rider groups and Internet newsgroups can be very helpful, though it helps to have a good understanding of recumbents before you go online.

Lastly, like my dad used to tell me, "There is no free lunch." You get what you pay for in the recumbent world. There are some good values, but beware of companies that you cannot find evaluations or opinions of their products, or that only sell discount on the Internet. A good recumbent bicycle with name brand components will be expensive.

WHERE TO GO FOR MORE INFO

Recumbents: alt.rec.bicycles.recumbent newsgroup; www.ihpva.org (HPV mailing list); www.recumbents.com; www.bentrider-online.com; **LWB ASS**: Easy Riders Recumbent Club: www.geocities.com/toureasylover; **Trikes**: www.ihpva.org (trike mailing list); **Lowracers**: Bryan Ball's Lowracer mailing list. ◆

RECUMBENT BICYCLES AND CLIPLESS PEDALS

by Bob Bryant

Clipless pedals can be a godsend or a curse for recumbent riders. Clipless pedals hold your feet onto the pedals. You clip in and clip out, much like a ski binding. The recumbent "feet forward" position increases the chance of your feet slipping off the pedals, so clipless pedals are a natural for recumbents. Or are they?

Clipless pedals were *not* designed for recumbent bicycle ergonomics (varying pedal heights and feet forward position), so a pedal that is very easy to enter and exit is doubly important. Ians Sims of Greenspeed has had clipless cleats wear out prematurely due to the outstanding pull-stroke that can be developed on a recumbent. This gives riders more power, but the pedal parts are not lasting as long.

There are two main types of accidents relating to clipless pedals and their use:

1. Clip-in or clip-out: With the higher pedal height, there is a clipless pedal clip-in and clip-out lag time as you raise your feet up or clip-out and set them down to the ground. This is when accidents can occur.

2. Putting your foot down while moving or in a crash situation: When your foot hits the ground while you are still moving, it can be sucked under the bike—which can lead to legs suck, which can lead to serious injury.

In theory, it would seem that a bike with a higher pedal height might need clipless pedals more. However, I have recently heard of and read about accidents involving low pedal height recumbents and leg suck, broken bone accidents. In these situations, riders seem to fare better when their feet stay clipped and they go down with the bike (in contrast do separating from the bike). These accidents are often the result of losing traction on one wheel or the other.

Many recumbent specialists recommend clipless pedals for all recumbents and riders. I personally ride a low and moderate pedal height recumbents and do not use clipless pedals, though I have in the past (and would again for long rides). I had a bad crash a few years back and went down hard. So hard that I bent the spindle of my expensive clipless pedals. I twisted my ankle bad, and just quit using them. I currently use bear-trap BMX/MTB pedals (ala Steve Delaire/Rotator) for my commuting and transportation/utility rides.

Some recumbent riders have gone to trikes for just such reasons. Zach Kaplan had this to say, "I got into trikes (tadpole) because they are the safest form of recumbents. I was tired of falling down on two-wheeled recumbents due to stupid little things like slick spots on the road, black ice, wet bricks, wet metal, front blowouts, broken front fenders and in the case of fully faired SWB, cross-winds. All of these crashes and injuries wouldn't have occurred on a trike. It is also a lot more relaxing not having to worry about balance, paying attention to the road surface, unclipping for stops and getting back in when the light turns green."

Our recommendation is for new riders to carefully learn how to use your clipless pedals and practice in a safe environment—before you head out to the street. As crash potential is considered, I still feel safer on a low pedal height recumbent, though a tricycle seems like the safest option. With a tricycle, you must also be concerned about overall height and visability in traffic with a tricycle. ◆

Recumbent Styles

By Bob Bryant

The Gardner Martin designed Sun EZ1 SC Lite CLWB

A pedal powered SUV—The Lightfoot Ranger dual 26 built in Montana. We expect a Ranger test bike sometime very soon.

Compact long wheelbase (CLWB)

(also known as "compact" or mid- or medium-wheelbase)

Definition: This bike has a 20/16 wheelset, a higher seat, lower pedals and usually above-seat steering. They are basically a LWB that has been shortened by raising the seat and using a smaller wheelset.
Price range: $529-$1999.
Suggested use: Recreational, commuting, light touring.
Wheelbase range: 50-60 inches.
Typical wheel sizes: 20-inch rear + 16-inch. front (if other it is a LWB).
Typical seat height: 24-25-inches.
Typical pedal height: 14-21-inches.
Performance: Low-moderate.

For

▲ Perfect for new riders
▲ Easy to ride and learn
▲ Great commuter/utility bike
▲ Very compact & simple design
▲ Idler-free drivetrains (several models)
▲ Best recumbent values

Against

▼ Can be heavy
▼ Rearward center-of-gravity
▼ Hill climbing may suffer
▼ Performance may suffer
▼ Upright position can mean recumbent butt
▼ Tall/heavy riders beware of one-size-frames (and potential suspension pogo)

This design is the most popular recumbent type in the world today. The CLWB is a more casual and recreational recumbent bicycle, though they are used for commuting and touring. It is the most user-friendly, and affordable of recumbent styles. It is also the easiest to find at a dealers.
Examples: BikeE, Sun Supercruiser EZ1, and Cannondale Easy Rider.

Long wheelbase (LWB)

Definition: These are the long and limo-like recumbent models having wheelbases of 60-70+ inches. The pedals are behind the front wheel. The LWB design concept dates back to the turn of the century.
Price range: $799-$7999.
Suggested use: All around, performance, touring.
Wheelbase range: 60-70-inches.
Typical wheelsizes: 20/20, 26/26, 700c/700c, 700c/20 or 26/20.
Typical seat height: 15-27-inches.
Typical pedal height: 12-22.5-inches.
Performance: Moderate to high.

For

▲ Easy to ride and very forgiving
▲ Very cool Easy Rider style
▲ Excellent stability
▲ Excellent performance (ASS models with lexan fairings)
▲ Many are time proven refined designs

Against

▼ Can be heavy
▼ Can be difficult to transport and store
▼ Low speed maneuverability can be a concern (especially high pedal height)
▼ Upright position may = recumbent butt
▼ Higher seat models have a more rearward center-of-gravity

There are four basic types of LWB:

1. LWB ASS (low pedal height)—The most popular and time proven recumbent design of all time is the classic LWB above-seat steer with low seat and pedal height. It is a long and low Harley-esque Easy Rider looking bike with a low seat and ape-hanger style handlebars. These models are fast, tour well and are easy to ride with their low seats and pedal height. LWB ASS recumbents are the jack-of-all-'bents. They can do most things well, from commuting, touring, day rides and sport rides and they can be the most capable and dependable loaded tourers. They also offer exceptional user-friendly performance as Lexan fairings are easy to add and are more effective on this design.
Examples: Easy Racer, RANS Stratus, Lightfoot and Rotator.

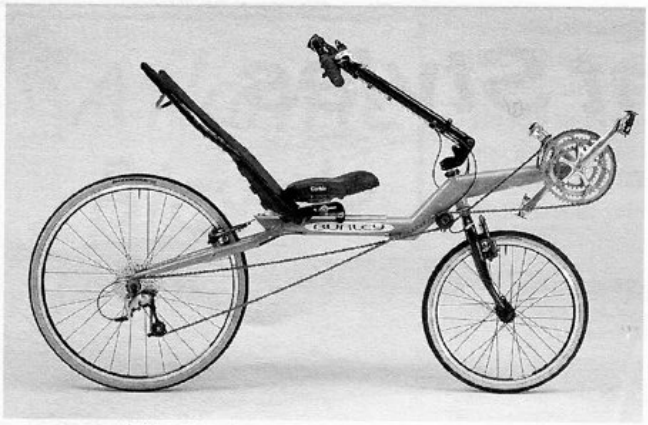
2. LWB USS—The LWB under-seat steering models are becoming more difficult to find. They are great for comfort touring, though they do not perform as well and some designs are very dated. They are also more complicated with remote steering linkages. They do not accept fairings as well.
Examples: Linear, Infinity and Longbikes.

3. LWB Monotube—This is usually a 26/20 wheel combo + monotube frame + higher pedal height: They have a high pedal height with the bottom bracket mounted at or behind the head tube on the main frame tube. Many have remote linkage above-seat steering (reduces tiller; adds complexity).
Examples Vision R40 MWB and Burley Limbo, Taiko and Canto.

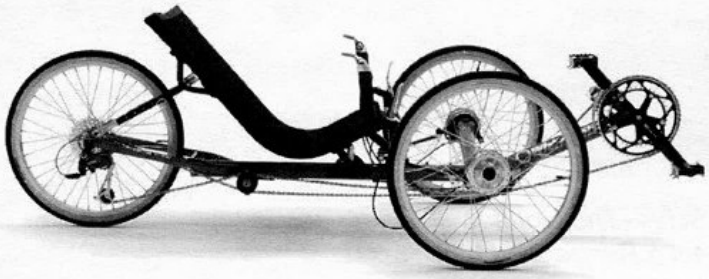
4. LWB 20/20: The RANS Wave and Tailwind have dual 20-inch wheels, which lengthen their wheelbase beyond that of a true CLWB and thus increasing performance.

Short wheelbase (SWB)

Definition: This design has become the sport touring enthusiast choice. The wheelbase is shortened by placing the front wheel under the riders knees (or just forward of it) and



The Burley Hepcat/Django SWB



2002 WhizWheelz TerraTrike

raising the pedals up to seat height (and higher). This design offers improved weight distribution, responsive road bike-like handling and lighter bike weights. However, there are also seat height concerns, heel/front wheel interference concerns, and chain management concerns.
Price range: $850-$5100.
Suggested use: Sport touring, club rides, performance.
Wheelbase range: 40-48-inches.
Typical wheelsizes: 26/16, 26/20, 700c/20, 2x700c, 2x26, 2x650c.
Typical seat height: 15-27-inches.
Typical pedal height: 22-31-inches.
Performance: Moderate-high.

For
▲ Lighter
▲ Responsive steering
▲ Quick handling
▲ Enthusiast choice
▲ Easier to transport
▲ Lots of models to choose from

Against
▼ Light weight sometimes = flexible frames
▼ Not everyone adapts to high pedal heights
▼ Not everyone adapts to very laid back seats
▼ Some seat heights tend to be too high
▼ Some have heel/front wheel interference
▼ Often require clipless pedals
▼ Leg suck is a concern

There are several different types of SWB:

1. American SWB—A relatively tall bike with a SWB, a mesh or mesh hybrid seat and moderate to very tall pedal height. The American SWB usually has a more upright seat (though adjustable) and are designed as sport touring bikes to be used for many types of riding. Examples: Vision, RANS

2. European SWB—A relatively tall bike with a SWB, a very reclined hard shell Euro-seat and a very high pedal height. These are more performance oriented designs, though in Europe they are used for touring as well.
Examples: HP Velo Street Machine There is also models that fit between. An example of this would be the Burley Hepcat/Django

Two derivatives of the SWB design are the Lowracer and the highracer, both based upon SWB designs.

3. Lowracer—Imagine being so low that your palms can touc the ground—you are stretched out, laid back with your feet up hi This is the very fast Euro-lowracer. Originally based on a stretec out and lowered SWB. They were initially only for the race track more streetable models are appearing, as well as advanced enthu asts to ride them. There are still questions as to how safe they are the road.
Examples: HP Velo Streetmachine, Optima Baron, Challenge, Zo and Toxy.

4. Highracer—Though relatively new in the USA, these were popular in the mid-late 1980's in Europe. These are SWB with fu size (26-inch, 650c or 700c) wheelsets put on them. They slice through the wind and the large diameter performance wheelsets make them an interesting, though extreme choice for tall athletic riders.
Examples: Bacchetta Strada & Vision Saber.

SWB can be very quick handling, which some riders may not b able to handle. Some riders will find them too tall to ride or the positions too extreme (due to high pedal height and/or very laid b seat positions. Especially if they have full hammock mesh seats. These bikes are best suited to avid, serious and very athletic enthusiasts.

Trikes

Definition: Three wheeled recumbent tricycles come in two varieties:

A. The delta has two wheels in back, one in front. These work for touring, recreational riding and are ideal for utility, trucks, pedicabs and even special needs.

B. The tadpole has two wheels in front and one in the back. Th are more aggressive low slung performance and touring recumbe They often have more extreme riding positions than deltas and ot recumbent styles.
Price range: $699-$2990 (delta) and $2295-$5300 (tadpole).
Suggested use: (see above).
Wheelbase range: 32-41-inches.
Typical wheelsizes: 700c/20/20, 26/20/20, 3x20, 3x16.
Typical seat height: 4.5-17-inches (tadpoles; delta NA).
Typical pedal height: Low (delta) to high (tadpole).
Performance: Low-moderate (delta) to moderate-high (tadpole)

For
▲ Slot-car like handling
▲ No balance required
▲ No legs down at stops
▲ No unclipping from pedals at stop lights
▲ Can be low to the ground
▲ Best fun on a recumbent

Against
▼ Most trikes are heavy
▼ More difficult to transport
▼ Trikes are expensive and more difficult to find/test ride
▼ Frame needs to be tough & stiff
▼ Most are slower than a two-wheeler
▼ Can be too tall and tippy (some deltas)
▼ Can be low to the ground (tadpole)
▼ Requires body English (less upper body relaxation)

These pedal powered sports cars cross the spectrum from casua commuter to performance machine. Performance trikes have two wheels in front (tadpole) with the drive wheel in back. These trike

have rather extreme riding positions with laid back seats and high pedal heights.

Trikes can be safer than some two-wheeled recumbents in that you do not have to un-clip or put your feet down at stops, and you have built in stability for clipping in to your pedals. On the other hand, trikes can be very low, which may present a safety concern in some situations.

The more variety of trike has two wheels in back (delta) with a higher center of gravity. They work well for touring, utility, cargo-carrying and those with special needs, balance problems or those who don't like being so low to the ground. Delta trikes are tippier than tadpoles due to the higher center-of-gravity.
Examples: (tadpole) Greenspeed, Trice, WizWheelz; (delta) Penninger, Hase, HPM.

Tandem

Definition: Two-rider recumbent bikes come in the following varieties: SWB (BikeE, Double Vision and RANS Screamer); LWB (former Ryan DuPlex), tadpole trike or delta quad. The most popular is the SWB.
Price range: $2500-$5999.
Suggested use: All (touring requires a serious, robust bike with adequate braking which should include a drag brake).
Wheelbase range: 55-75-inches
Typical wheelsizes: 26-inch rear + 20-inch front. One model has a 20/16.
Typical seat height: 10-26-inches.

The RANS Vivo suspension SWB

BikeE E2

Typical pedal height: 24-26-inches.
Performance: Moderate.

For
- ▲ Most are very stable
- ▲ The ultimate tourers
- ▲ Bring 'bent cycling fun to others
- ▲ Family recumbent fun
- ▲ A cycling couple's equalizer
- ▲ You'll have somebody to make sandwiches and peel bananas

Against
- ▼ Long....a road limo
- ▼ More difficult to transport
- ▼ Expensive
- ▼ Make sure braking is adequate when you go down mountains
- ▼ Slower on hills
- ▼ Don't work as well with kids
- ▼ High captain's position (SWB)

The majority of recumbent tandems are based on a very similar design theory. They have a SWB front end and a LWB rear end (stokers pedal height is usually lower).

The good ones are expensive and for serious enthusiasts. They are available in USS or ASS. Variations may be in wheel sizes making for a more compact family tandem. Examples: RANS Screamer, ATP Double Vision and BikeE E2.

There are tandem tadpole trikes available, as well as hitches that can connect two delta trikes making for a 5-wheel tandem. Examples: Hase & Penninger. Through the years there have been other recumbent tandem types: the double LWB (Ryan; currently not available), and even back-to-back SWB style tandems. ◆

Recumbent Bicycle Systems and Componentry

by Bob Bryant

RECUMBENT COMPONENTRY

Recumbent component quality can vary dramatically. Finding a bike with a complete group is difficult, though we start to see them in the $1000 and up range. The high end parts like ESP 9.0, Shimano 105 or Ultegra come on bikes in the $2000 + range.

Entry level recumbents in the $500-$1000 tend to have component mixes that include some lower end no-name brand parts. They often have Sunrace (cassettes and shifters), Dotek cranks or other brand names that you have never heard of. This is how the manufacturers keep the prices down. These parts won't last as long, but they seem to work fine—at least when new.

Recreational enthusiasts do not need the best componentry (unless of course you want to have it). If you go with the cheapest entry level stuff, and then use your bike as daily transportation, you will end up replacing parts and doing a lot of maintenance because you are using your bike more intensely that it was designed for.

What value-minded enthusiasts should look for is that point in which value, durability and dependability all meet. For most of us, this is Shimano Deore, LX and 105 and some may also include SRAM ESP 7.0. I feel that Shimano drivetrains still shift better.

Spending more money on components does not always bring durability and improved shifting quality. It generally brings product finish refinement and a lighter weight. High end derailleurs often will have cartridge sealed bearing pulleys. Lighter parts are not always more durable.

A word on upgrades—It is really difficult to detect a difference between a low end derailleur and a high end, other than by appearance. If you have a really low end bike (one of the $500 models), you are probably best leaving it alone and saving your money for a more upgraded model. In the $1000 and up range, some upgrades make sense. The first place to spend your money is on a custom set of hand-built wheels, and next would be a high end bottom bracket. My theory is first upgrade the parts that roll: wheels, hubs and bottom bracket. You can also feel the difference in a good cartridge sealed bearing headseat such as those made by Ritchey and King.

Cranksets—Mostly we find name brand cranksets on more expensive bikes. We have yet to have a problem with any cheapie cranksets, though higher quality cranks and chainrings last longer. Easy Racers (Tour Easy) and BikeE have their own custom cranksets made for them. BikeE's crank has inner and outer chain guards that keep the chain on with 3x7/8/9 and mid-drivetrains.

Shifters—We've had good experiences with Sunrace, SRAM and Shimano shifters. Here are some different types of shifters:

Twist Grips— The SRAM ESP 7.0 that is so popular on BikeE and RANS products seem to be trouble free, though perhaps not as much so as Shimano. The shift and adjust easily and it doesn't take much pressure to shift them. However, they do make a fairly loud "click." I was surprised at how well the Sunrace on our EZ1 SC Lite worked. I guess the truth will be in the longevity. Previous skeptics are being surprised by Sunrace.

Bar-Con (bar-ends)—These Shimano Dura Ace shifters have been the touring standard for decades. They are the finest shifters made. They are durable, have a friction mode and are wonderful to shift. They do not work well with all recumbent handlebar styles. They are great on Easy Racer style ASS or Greenspeed style USS.

Rapid Fire—This is the two button under-bar Shimano MTB shifting scheme. One button is for upshift, the other for downshift. I rode these for years on my MTB and loved them. I recently had a bad experience on a new recumbent where the front shifting took an incredible amount of pressure which is unacceptable.

STI (brake lever shifters)—These come on a few recumbents. They were designed for road racers and only work on a few recumbents. They are fancy and expensive. The brake lever must be moved sideways for each shift. Just don't combine this with a "pull" or you'll be doing a combined stop/shift.

Derailleurs—The higher end derailleurs (XTR and ESP 9.0 SL) are lighter and have cartridge sealed bearing idler pullies. Most modern derailleurs work very well. The mid-upper ange Shimano a certainly the best values, and most robust derailleurs.

Internally geared hubs—The most popular internal hub is the SRAM DualDrive (3x8/9; previously known as the Sachs 3x7). This has three speeds in the hub combined with 8/9 derailleur gears Rohloff has a unique 14-speed internal hub that works very nicely while offering a full range of gears. We have heard some complaint about oil leakage early on, so you might want to check with your dealer for an update. They are very expensive. The Sachs/SRAM and Shimano Nexus 3, 4, and 7-speed hubs are not suited for recumbents unless you ride only on flat terrain.

Chain—The long recumbent chain actually makes shifting easie as you do not have to worry about the chain deflection angle (big to big or small to small) between the crankset and cassette gears. With two- chain mid-drives, this can be a concern and you'll need t learn which gear combinations not to use.

The best recumbent chain is SRAM (formerly Sachs). Shimano i good as well. Some recumbents come with a KMC or Sunrace chai which are not considered as good. However, don't rush to replace it unless you are having shifting problems. If you opt for a friction drivetrain chain quality and brand is not as important (and you won be using 9-speed chain).

If durability is a concern to you, consider building up a 7/21 or 8/24-speed bike. 9/27-speed drivetrains require more frequent indexing adjustments, and very narrow chain shifting narrower cassette cogs. The chains do not last as long, and are more prone to failure. We recently had a SRAM 9-speed chain fail at 800 miles on a 3-month old bike. We have heard many instances of premature 9-speed component wear (the cassette cogs are 40% thinner). We have also heard from riders who have had no problems. This probably can effect heavier riders, utility riders that carry big loads, performance riders (who push big gears) tourists, and riders who climb hills more often.

Brakes—V-brakes are expected these days. Avid is considered to be the best. Shimano and Tektro are also powerful recumbent stoppers. Our SRAM ESP V-brakes pads wore out prematurely. A few roadie type recumbents have Shimano road calipers. These are not as powerful as V's, but are elegant and strong for skinny tire 'bents. Beware of any manufacturer who does not offer braking on both wheels or is still using BMX caliper brakes.

Disc brakes—These are the finest brakes, though are not easily user-serviceable (require a good local mechanic) or at least a committed owner and a builder who specs them.

Hydraulic rim brakes—are incredibly strong and modulate bett than any other kind of brake. They are not easily user-serviceable, require a good local mechanic AND they heat up the rims (worse on smaller wheels).

Headsets—A good brand name road or 1-1/8" MTB headset is th best way to go for most recumbents. Cheapie models, especially on

SWB recumbents will be problematic. The ultimate is a Chris King or a Ritchey WCS (lifetime warranty) cartridge sealed unit. You can definitely feel the difference.

Bottom Bracket (a.k.a. crank bracket)—The new BB's are cartridge sealed from the factory. This means maintenance free (until they die). While this leaves the air of uncertainty, we've heard of the Shimano XT (UN72) lasting 15,000 or more miles. The Phil Wood is the ultimate.

Beware of cheapie bottom brackets on entry level bikes (even low-end Shimano models). I would consider removing your crank arms and chain to check how smooth it turns.

Maintenance & weird parts—The simpler and more straightforward your system the easier it is to work on. A basic Shimano or SRAM drivetrain with a full size drive-wheel (26-inch or 700c) is the most trouble free. If you buy exotic boutique parts, make sure that you have a dealer who knows how to work on them (disk brakes, custom shifters/derailleurs).

Mid-drives, internally geared hubs, independent pedaling options, and extreme chain lines (or upper chain idlers) will add friction to your drivetrain and may make a negative impact on your performance.

Non-standard drivetrain parts, disk or hydraulic brakes, or other proprietary parts can complicate your bike and make service and parts replacement more difficult, time consuming and costly. Our best advice is if you have unique parts to your drivetrain (like a mid-drive), keep some spare parts around (such as a mid-drive cassette). It is also important to live within close proximity to a shop with a competent mechanic—one who can work on your exotic parts.

Wheels—Most production bicycles do not have the finest quality wheels. Many are built in factories by machine or laborers working quickly. Some are over-tensioned. Our experience is that you are less likely to have trouble with a 20 or 26-inch wheel. The smaller 16 and larger 700c's seem to be more problematic in the entry level.

If you plan to upgrade, wheels are a good place to start. Finding a shop or manufacturer that builds wheels in house is a good bet. DT stainless steel spokes and a high quality rim is also a good idea.

Recumbent wheel sizes

700c—road bike size
26-in. 559mm—Common MTB size
650c—Triathathlete road size; rare
20-in. 406mm—Common BMX size, availability is excellent
20-in. 451mm—Skinny BMX size; rare
16-in. 305mm—Common recumbent and kids bike size
16-in. 349mm—Folding bike and recumbent road size; rare

Even good rim tape is worthwhile. Quiz your shop as to their wheel building procedures. We've had wheels on $1500 bikes that were very mediocre.

Small wheels are less stable, often roll slower, wear quicker, offer a more harsh ride and have less gyroscopic inertia. Small wheels are generally stronger, though parts can be more difficult to find. Heavy loads (forward center of gravity) and internally geared hubs accentuate this concern. The majority of 16-inch front wheeled recumbent are not fast bikes.

If you are looking for a matched tire set, the 26/20, 20/20 and 20/16 wheel combos are your best bet. Ritchey now makes a 700c/20-inch 406mm tire size match.

We recommend that you keep at least one spare tire and tube around for each size of wheel that you have. Though you might be able to find the above more common sizes in your locale, finding the right tire can be very difficult unless you have a recumbent specialist in your town.

Hubs—Mid-range Shimano hubs are excellent. The value, durability and quality is exceptional. We haven't had any trouble with SRAM ESP hubs, but they are relatively new to the market. Many manufacturers are slipping in no-name hubs even on relatively expensive bikes. Phil Wood cartridge sealed bearing hubs with CroMo axles are the best.

Rims—Cheap rims often have noticeable seams that make a ticking sound when the brake pad comes around and hits the seam.

Being that most of these are 20 or 16-inch wheels, they tick a lot. Your best advice is to be a recommendation from a picky custom-spec/custom-wheel builder who knows recumbent wheels.

Tires—Recumbent riders need to find tires that match their bike, terrain and their body size. The choices for tire selection seem to be the 26/20 406mm, 20/20 406mm, and 20 406mm/16 305mm combinations. This is primarily because these are the most popular recumbent combinations and sizes, with better tire availability, or where the builder stepped in and had tires made (which is the case with the Hookworm Maxxis and Primo Comets in 20 and 16-inch sizes). Comp Pools are still a favorite for the fat 20-inch riders. Vredestein S-Licks are the performance riders' choice. A matching tire set is a nice attribute. The 700c tire matches are more difficult. Angletech is offering a 700/20 406mm matching set by Ritchey. We suggest that you contact a recumbent specialist dealer (RCN advertisers) for tire model, availability and pricing.
Note: Keep in mind that there are two 16-inch sizes (305mm BikeE size and 349mm folding bicycle size) and two 20-inch sizes (406mm common BMX size and 451mm). The tires do not mix or fit the others rims.

Fat tires—Most recumbents, riders and terrain could benefit from fatter tires. The added air volume will allow for a softer ride, give you more traction and more cushioning (as you can't deweight your seat as on an upright) and they are more durable.

Suspension—Though suspension makes for a very comfortable ride, it complicates the bike, is more expensive, and requires more maintenance. CLWB and LWB can best utilize rear suspension. SWB can best utilize front suspension, with the secondary addition of rear suspension. Suspension can complicate the addition of racks, fenders and fairings. Cargo carrying in general can be more difficult. Be sure that you (and your intended cargo) are incompliance with the load limit of the bicycle. Always consider the total sprung weight that you will carry on your bike (total rider weight + racks + cargo + bags + spares + tools).

Be aware that many recumbent suspensions are not always state-of-the-art, but can still offer a comfortable ride. Some recumbent rear-suspensions have high pivot points, which increase unwanted pogo effect (pedal activated suspension movement) and/or will require more air in the shocks to compensate.

Many recumbents use air-shocks, which require a special pump and have weight limits. The coil-oil shocks are heavier, more expensive, more adjustable, offer a generally more actively suspended ride and come in up to 10 sizes for varied rider weights.

In previous years, recumbent front suspension forks are primarily made for BMX bikes. The lower priced models are nonadjustable and mediocre at best. For 2002, we have two new entries. Cannondale has their Hedshok on the new Easy Rider model, Angletech has the carbon fiber/aluminum Meks suspension fork, Boulder Bikes, Barcroft now uses an Action-Tec fork.

Recumbent component selection, especially on enthusiast level bikes, is a bigger concern than on upright bikes. We use lots of chain, so we need good and durable chain. Recumbents are slower on hills and you can't stand on the pedals, so you need a plan for your bikes gearing that is carefully thought out. If you take the time to do this, your cycling experience will be more enjoyable.

RECUMBENT FRAMES

Because there are no arbitrary rules to limit the design process, recumbents come in every shape and size you can imagine. There are small companies pushing the design limits, and quality and durability can vary. Some manufacturers outdate their designs every few years—yet others are classics and have been in production for many years. These timely designs may not be initially as exciting or have the latest buzz, but they can last a lifetime with good care.

Many recumbent frames are still hand-built in the USA (or in the country of manufacturer origin). Some build here, but have certain parts (often forks, tube-sets, or steering stem/risers) made in Taiwan. Some manufacturers have their frames built in Taiwan (and painted and assembled here) and some have their bikes completely built, painted spec'ed, with Taiwan built wheels, packed and shipped to the USA. You will most often find this on less expensive recumbents, though some builders are doing this with bikes as expensive as

concern to you, ask if it has any frame parts that are built overseas. Also remember that not everyone is doing it. There are still bikes that are built in the USA by craftsman who own small companies.

Several frame designs now use cantilevered rear stays. These do not have traditional diamond-frame style triangulation, but instead rely on a beefy tandem-style fork blade. Many have seat braces that appear to integral frame members (triangulation), but they are not, they are just seat supports. These monostays offer some passive suspension. This can be good for recreational or sport tourists, but bad for anyone hauling a load or towing a trailer as they may have less torisional rigidity (which may affect tracking and stability).

Recumbent bicycle frames can be made from the following materials:

1. HiTen Steel (mild-steel): This is very similar to low end upright bikes. In recumbents, we find the use of rectangular steel.

2. CroMo Steel: This is aircraft chome-moly steel and is about as tough and durable as you can find.

3. Aluminum: Is lighter, softer and less durable than steel. Once heat-treated it cannot be repaired. Your best bet is to buy from a reputable builder with known durability. Thin tubes will have some flex, oversize tubes will be very stiff.

4. Titanium: Is lighter, stronger and more expensive than CroMo. It does flex more and makes for a unique more suspended ride. It is difficult to work with, expensive and generally lighter (though sometimes more material must be use for the same stiffness). If you can afford it, Ti is the best.

5. Composite: Though lightweight and supposedly bulletproof, composites in the bike industry have a less than stellar durability record. This should only be considered for racers and collectors who do not plan to use it as their primary bike.

Recumbent frames tubesets vary from rectangular hiten steel, to straight gauge aircraft CroMo, to custom tubesets in neat custom shapes and sizes.

Recumbent frame designs can be traditional triangulated designs that look somewhat like diamond frames, to unique I-beams, to monotube designs. Generally, monotubes will flex more.

Use common sense when selecting a recumbent frame. If you are a big burly rider who is hard on equipment, or you haul heavy loads or tow trailers, don't look for a featherweight or monotube/monostay frame. If you are a lightweight athletic rider who carries a 1-pound pack, these petite frames were made for you.

RECUMBENT SEATS:

Mesh, moulded shell or a combination?

Mesh back/base—A hammock/lawn chair type seat. These have frame rails for the back and base with finely crafted and adjustable mesh sections that "sling" your body. These are the best for long term comfort, though can make the bike feel tall and be more difficult to hold up at a stop. Some mesh seat backs have more "push-through" which can negatively affect performance. A curved performance. A good full mesh seat is considered the "holy grail" by many seasoned recumbent riders—especially those interested in touring and comfort. Unfortunately, the makers of the best mesh seats are generally manufacturers of bikes with high pedal heights and/or closed riding positions (upright seat + high pedal height) which do not accentuate the comfort possibilities of their exceptional seat designs).

Examples: Rotator, Lightning, Cycle Genius, Longbikes.

Mesh back/moulded base—The height of the mesh seat base necessitated the design of the mesh back/composite base seat designed by Rans back in the early 1990's. Back then, the Counterpoint Presto and Lightning seats were considered the most comfortable. The design evolution towards 20-inch front wheels made the seat bases too high for the average rider, thus the ergonomic cut-away seat base. Some describe it as a lawn mower or tractor style "bucket seat." These seats can be very comfy as long as the base is big enough, shape ergonomic enough, and foam plush enough. Taller and heavier riders should take a long test ride to see if the base foam if they develope recumbent butt. This is the most popular type of recumbent seat:

Examples: RANS, Easy Racers (Kool Back), BikeE, and Burley.

Vision uses a seat that crosses in between the full mesh and a combination. It is basically a mesh seat with cut down sides, and the material pulled tight to a seat horn. Some riders are bothered by the seat horn (crotch area), yet others "bottom out" on the base foam and feeling the frame tubes beneath (optional inflatable pad is available from Vision).

Moulded shell/foam covered—These seats have aluminum, fiberglass or composite shells and they are very stiff. The can be less comfortable, but if you like to push into your seat for power, this is the way to go. Compared with comfort-based, seats they are not as comfortable. They were developed for racing and more readily adapt to tailboxes.

Euro seats are similar to the above, but have a dramatic lumbar curve and a very laid back stature. These do not work for everyBODY. Suspension may be necessary with these as well.

SEAT ADJUSTMENT METHODS

Recumbents adjust to fit varying rider sizes in the following different ways:

Sliding seats—These seats slide on seat tracks (that can be a part of the frame, or attached to the frame). These work best on recumbents that come in frame sizes (to achieve optimum center of gravity) and for taller/heavier riders.

Sliding boom/mast—Telescoping pedal tube (frame section) that slide out of SWB and trike mainframes to accommodate different leg lengths. The adjustment may require the shortening or lengthening of the chain (require new master links). Keep an extra boom bolt in your spares kit. For 2002, Vision has come out with an excellent new quick adjust kit/boom that as a self aligning feature. ◆

Angletech & Custom Spec

by Bob Bryant

Kelvin Clark's involvement in recumbents goes back over 15 years—predating even RCN. Kelvin got his start operating Angle Lake Cyclery in Seattle where I took my first recumbent ride back in 1986. Kelvin later relocated the custom spec recumbent division to Woodland Park, Colorado, a wonderful little mountain town above Colorado Springs and in the shadow of Pikes Peak.

Angletech does sell stock recumbents, though their specialty is custom spec. This means taking either a stock or custom frame, and carefully building it up to with high-end componentry that is chosen to work best for the intended style of riding for the particular model. Angletech is also one of just a few dealers/manufacturers who offers optional custom paint colors ($225 and up).

Another specialty item at Angletech is custom built recumbent wheels. The wheels are built in house by Angletech's mechanic/ wheel builder Jim Farrell. They use Bontrager rims, DT stainless spokes, Ritchey or Phil Wood cartridge sealed bearing hubs and Salsa rim tape (extra heavy duty). All of the bikes include SRAM (formerly Sachs) chain which is the best, and a final adjustment and road test prior to shipping.

Angletech specializes in recumbent bicycles for recreational riders, tourists and commuters. Here are the spec groups that Angletech will offer for 2002:

ST27—This spec is one step up from most stock specs, though is not a complete group. The package includes SRAM Plasma rear derailleur, a Shimano 443 front, Shimano Dura Ace barcon shifters, a Suntour Superbe cold forged crankset with ramped 30/42/52 chainrings, a Phil Wood bottom bracket, a cartridge sealed bearing Ritchey WCS lifetime warranty headset, Avid V-brakes, custom wheels with Bontrager rims and Ritchey hubs. This package is found on Angletech's Easy Racer Tour Easy, Gold Rush, foldGold, Bacchetta Giro and others.

GL81—This is the SRAM Dual Drive (formerly 3x7; 63-speed) drivetrain. For 2002 this spec includes 72 or 81 speeds (3 internal gears x3 front chainrings x8/9 rear derailleur gears). This makes for the super wide gear ranges that make climbing mountain passes in Colorado on a recumbent possible. This spec also comes with a Suntour Superbe cold forged aluminum crankset, SRAM 9.0 SL derailleur and shifters, a Phil Wood bottom bracket, a Ritchey WCS lifetime warranty cartridge sealed bearing headset, Avid V- brakes. Lastly, the GL81 has a $100 upgrade that includes a Phil Wood front hub and Avid disc brakes. The GL81 package can be added to several recumbents, including the popular RANS V-Rex.

SHO —The high performance showcase models are labeled SHO. They come with Rolf rear wheels (Rolf is no longer part of Trek; Mr Rolf actually rides a recumbent), a Hed front wheel, Dura Ace barcon shifters, SRAM Plasma/Shimano derailleurs, SRAM PC89R chain (drilled), Profile Carbon-Fiber crankset, Race Face ramped and pinned chainrings, Phil Wood Ti bottom bracket, and Vredestein S-Lick tires (handle better than Conti's).

Keep in mind that this is a custom spec shop, so if you don't see what you are looking for, or the model of your choosing, ask. If they cannot build it, they can certainly offer a recommendation as to what else may work.

Angletech does not actually build any frames. They are involved in the building of the former Counterpoint Opus tandem (1/2 recumbent + 1/2 upright), whose frame is built in the Seattle area. The MC2 SWB, Trispeeder and QuadraPed frames are built by Mark Nobillette in Colorado, and the Altitude is built by Rich Williams of Boulder Bikes.

The QuadraPed is a unique trike that offers both arm and leg power. It was designed by Gary Hale back in the 1980s, refined by BikeE's Richard Rau in the 90s, and now offered by Angletech. This very cool trike offers the most exhilarating workout of any hpv I've ever tried. It has a unique low pedal height, a full mesh seat, an drivetrain with a neutral gear. For 2002, there is a new short boom for shorter riders, and even an "S" model for kids or very short riders. The arm and leg power is also well suited for special needs if a rider has one week leg or arm, though everyone will get a kick out of the QuadraPed.

Another part of Angletech's business is custom tandems. The RANS Screamer seems to be the tandem of choice. Angletech offers a Screamer GLX which has a Meks 20-inch carbon fiber front suspension fork (optional on many models; comes in 1" or 1-1/8" headset sizes). The fork comes with V-brake and disc brake mounts, and his made of carbon fiber and 7075 aluminum. The rebound dampening has both a coil spring and elastomers. This fork will replace the Ballistic forks as the optional suspension fork for their 2002 line.

So what is the downside. There is no immediate gratification. If everything goes as planned, expect a 4-6 week wait for a model using a stock frame (such as the Bacchetta, RANS or Easy Racer framed bikes) or 3 months or more on a custom Angletech Altitude SWB, MC2 SWB or Quadraped trike. ◆

Manufacturer Contacts

Angletech
Tel: 719-687-7475
Web: www.angletechcycles.com
Products: Trikes & SWB ASS

ATP Vision
Tel. 206-467-0231
Web: www.visionrecumbents.com
Products: SWB, MWB and tandem

Bacchetta Bikes
Tel. 785-625-5685
Web: www.bacchettabikes.com
Products: SWB ASS recumbents

Barcroft
Tel. 703-750-1945
Web: www.barcroftcycles.com
Products: SWB ASS 26/16 and 26/20

Big Cat HPV
Tel. 407-293-1626
Web: www.catrike.com
Products: Tadpole USS trike

BikeE
Tel: 800-231-3136
Web: www.bikee.com
Products:CLWB ASS & tandem

Bike Friday/Greengear
Tel. 800-777-0258
Web: www.bikefriday.com
Products: Folding folding SWB

Brox
Tel: 0161 775 4977
Web: email: rjbrock@cwcom.net
Products: Quad truck

Boulder Bikes
Tel. 303-823-5021
Web: www.boulderbikes.com
Products: Full suspension SWB ASS

Burley Design Coop
Tel. 541-687-1644; 800-311-5294
Web: www.burley.com
Products: SWB and LWB ASS

Cambie Cycles (Canada)
Tel. 604-874-3616
Web:www.cambiecycles.com (Canada)
Products: LWB ASS

Cannondale
Tel: 1-800-BIKEUSA
Web: www.cannondale.com
Products: CLWB ASS full suspension

Challenge
Tel. NA
Web: www.challenge-ligfietsen.nl/
Product: Lowracers & Euro SWB

Crank-It
Tel. 888-747-2038
Web: www.crank-it.com
Products: Offroad quad & tadpole trike

Cycle Genius
Tel: 866-901-BIKE (2453)
Web: www.cyclegenius.com
Products: CLWB ASS

Dolce-Vita
Web: www.dolce-vita-bike.it/
Design Specialty: SWB

Easy Racers, Inc.
Tel. 408-722-9797
Web: www.easyracers.com
Products: LWB ASS

Greenspeed (Austrailia)
Tel. +61 3 9758 5541
Web: www.greenspeed.com.au
Products: Line of tadpole USS trikes

Haluzak
Tel. 707-544-6243
Web: www.haluzak.com
Products: SWB USS and delta trike

Hase Spezialrader (Europe)
Tel. ++49 2309 782582
Web: www.hase-spezialraeder.de
Products: Delta & folding trike

Hotmover (Australia)
Tel. +1 760 874-8030
Web: www.hotmover.com
Products: Tadpole trikes

Human Powered Machines
Tel. 800-343-5568
Web: www.efn.org~cat
Products: SWB, LWB, & folder

HP Velotechnik (Germany)
Tel. ++49 (0) 61 92 4 10 10
Web: www.hpvelotechnik.com
Products: Euro SWB & lowracers

Infinity
Tel. 480-991-5430
Web: www.bikeroute.com/Infinity.htm
Products: LWB USS

Inspired Cycle Eng. (ICE) (UK)
Tel. (011 44) 1326 378848
Web: www.ice.hpv.uk
Products: Tadpole trikes + tandem trike

Just Two Bikes
Tel. 800-499-1548 or 651-426-1548
Web: www.justtwobikes.com
Products: FWD delta trike (folding)

Leitra DK ApS (Denmark)
Tel/ fax: +45 48 18 33 77
Web: www.leitra.dk
Products: Enclosed velomobile

Lightfoot Cycles
Tel. 406-821-4750
Web: www.lightfootcycles.com
Products: LWB ASS, trikes and a quad

Lightning Cycle Dynamics
Tel. 805-736-0700
Web: www.lightningbikes.com
Products: SWB ASS

Linear Bicycles, Inc
Web: www.alpinecom.net/linear
Tel. (563 or 319) 252-1637
Products: LWB & CLWB USS

Longbikes
Tel. 303-792-2242
Web: www.tandembike.com
Products: LWB ASS/USS

MicWic
Tel: 44 (0) 1793 852484
Web: www.micwic.com
Products: Back to back tandem

M5 Ligfietsen—Europe
Tel. +31 (0) 118 628759
Web: M5-ligfietsen.com
Products: Lowracers

Organic Engines
Tel. 850-224-7499
Web: www.organicengines.com
Product: Trikes, SWB & trucks

Penninger Recumbents
Tel. 630-377-1696
Web: www.penninger.com
Product: Kit to mate two trikes

Radius USA
Tel. 973-340-9006
Web: www.radius-recumbents.com
Products: MWB & SWB

RANS Recumbents
Tel. 785-625-6346
Web: www.rans.com
Products: SWB, CLWB, LWB & tandem

Reynolds Weld Lab
Tel. 603-432-7327
Web: www.reynoldsweldlab.com
Products: SWB semi-lowracer

Rhoades Car International
Tel. 1-615-822-2737 Ext. 16186
Web: www.4wc.com/?16186
Products: Four wheeled pedal cars

Rotator
Tel. 707-539-4203
Web: www.rotatorrecumbent.com
Products: LWB & SWB & trike ASS

S&B Recumbent
Tel. 310-762-2243
Web: www.home.pacbell.net/recumbnt/
Products: SWB Delta trike & tandem

Sidewinder Recumbents
Tel. 805-640-0504
Web: www.sidewindercycle.com
Products: Tadpole trike RWS

Sun Bicycles
Web: www.sunbicycles.com
Tel. See your local dealer
Products: CLWB, trike & quad

TerraCycle
Tel. 800-371-5871
Web: www.terracycles.com
Products: SWB ASS

Trailmate
Tel. 800-777-1034
Web: www.trailmate.com
Products: Kids & rental trikes

Turner Enterprises
Tel. 520-290-5646
Web: www.turnerrecumbents.com
Products: SWB USS

Varna Innovations & Research
Tel. 250-247-8379
Web: www.varnahandcycles.com
Product: SWB, CLWB & handcycles

Velo Nouveau/Burrows Engineering
Tel/Fax: 44 (0) 1603 721700
Product: SWB ASS

Wicks Aircraft
Tel. 800-221-9425
Web: www.wicksaircraft.com
Products: SWB USS & tadpole trikes

Windcheetah/AVD (UK)
Tel. 0044 (0) 161 928 5575
Web: www.windcheetah.co.uk
Products: Tadpole trike.

WizWheelz
Tel. 616-948-4693
Web: www.wizwheelz.com
Products: Tadpole USS trike

Yellowbike (Optima)
Tel. 888-846-7386
Web: www.yellowbike.com
Products: Euro-style SWB & lowracers

Z-Bike (formerly Backsafer)
Tel. 800-815-2225
Web: www.bikeroute.com/backsafe/
Products: CLWB ASS

Zox
Tel. +49 (0) 91 31 - 7 19 73 - 21
Web: www.liegerad.com
Products: Euro FWD SWB/lowracer

Note: Check with dealers who specialize in Euro bikes for more models/ manufacturers.

2002 Recumbent Directory

Models currently being sold in the USA

(Sorted by price)

Two Wheelers

CLWB

Price	Model	Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$529	**Sun EZ1**	Sq. hiten steel/ASS	21-speed mix	20/16	56/24/14.5/#39	Mesh back/moulded base
$550	**Cycle Genius**	CroMo hiten mix/ASS	SRAM 3.0/5.0 mix	20/16	51/24.5/20.75/40	Mesh back/base w/springs
$700	**BikeE CT**	Aluminum/ASS	SRAM 3.0/3x7 mix	20/16 BO	56/25/17/#28	Mesh back/moulded base
$750	**Sun EZ1 SC Lite**	Square alum./ASS	24-speed mix	20/16	56/24/14.5/#35	Mesh back/moulded base
$959	**Linear**	Alum.ASS or USS	24-spd. mix	20/16	NA	Mesh back/moulded base
$1230	**BikeE AT**	Aluminum/ASS	SRAM 5.0/3x7 mix	20/16 BO	56//25/17/#30	Mesh back/moulded base
$1500	**BikeE RX**	Alum. rear susp./ASS	SRAM 7.0 Mix	20/16	52/29/21/#32	Mesh back/moulded base
$1700	**BikeE FX MTB**	Alum. full susp./ASS	SRAM 7.0 Mix	20/16	52/29/21/#32	Mesh back/moulded base
$1999	**Cannondale Easy Rider**	Alum. full susp./ASS	SRAM/LX mix	20/16	57/26/21/40.25 (LG)	Mesh back/moulded base

LWB

Price	Model	Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$799	**Rans Wave**	CroMo/ASS	SRAM 5.0 Mix	20/20 BO	61/23/19/#30	Mesh back/moulded base
$899	**Sun EZ Sport**	Hiten/ASS	Mix	26/20	NA	Mesh back/moulded base
$999	**Rans Tailwind**	CroMo /ASS	SRAM 7.0 Mix	20/20	61/23/19/#31	Mesh back/moulded base
$1159+	**Linear**	Alum. extrusion/USS	24-spd. mix	26/20	NA	Mesh back/moulded base
$1200	**HPM Roadster**	CroMo /ASS	Shimano/SRAM mix	26/26 BO (3x7 opt.)	61/NA/NA/#32	Mesh back/base
$1249	**Burley Canto** *convertible*	CroMo/ASS	SRAM 5.0/Shimano	26/20	62/24/24.25/#34.5	Mesh back/moulded base
$1399	**Burley Limbo** *convertible*	CroMo rear susp./ASS	Shimano mix	26/20	N/A/27.5/22.6/#38	Mesh back/moulded base
$1599	**Rans Stratus**	CroMo/ASS	SRAM 7.0 mix	26/20	66/21/14/#31	Mesh back/moulded base
$1650	**Cambie Recamboni**	CroMo/ASS	Shimano Deore/Tiagra	26/20	70/21/15/#33	Moulded
$1770	**Lightfoot Explorer**	CroMo/ASS	Shimano/SRAM	26/20 or 26/26	N/A	Moulded
$1735+	**Rotator Pursuit**	CroMo or Ti/ASS	SRAM/Shim. mix	20/20 700/20 or 700c	41-65/15/NA/#30	Mesh back/base
$1799	**Burley Taiko** *convertible*	CroMo/ASS	Shimano Deore	26/20	62/24/24.25/#32	Mesh back/moulded base
$1800	**Infinity**	Sq.alum./USS	Mix	26/20	NA	Mesh back/moulded base
$1895	**Easy Racer Tour Easy**	CroMo/ASS	Shim/SRAM mix	700/20 (451 or 406)	66-69/22/13/#30	Either mesh or moulded
$1949	**Rans Velocity Squared**	CroMo/ASS	SRAM 9.0/105 mix	26/20	66/21/23/#33	Mesh back/moulded base
$2399	**Angletech EZR TE ST27**	CroMo/ASS	SRAM/Shim./Phil/Avid	700/20 406	66-69/22/13/#30	Mesh back/moulded base
$2499	**Boulder Cascade**	CroMo/ASS	Shimano Ultegra	700/20	NA	Mesh back/moulded base
$2499	**Longbikes Slipstream**	CroMo/USS	Shimano LX/XT	26 or 700/20	NA	Mesh back/base
$2995	**Easy Racer Gold Rush**	Aluminum/ASS	SRAM/XT/Ultegra	700/20 (451 or 406)	66-69/22/13/#27	Mesh back/moulded base
$3500	**Easy Racer Fold Gold**	Folding rr susp./ASS	XT/XTR/Ultegra	700/20 (451 or 406)	66-69/22/13/#27	Either moulded or mesh
$3450	**Angletech GRR ST27**	Alum./ASS	SRAM/Shim./Phil/Avid	700/20 406	66-69/22/13/#27	Mesh back/moulded base
$3899	**Angletech Fold Gold**	Folding rr susp./ASS	SRAM/Shim./Phil/Avid	700/20 406	66-69/22/13/#27	Either moulded or mesh
$4295	**Rotator Pursuit**	Titanium/ASS	NA	20/20	65/15/NA/#21	Mesh back/base
$5000	**Easy Racer Ti Rush**	Titanium/ASS	SRAM/Ult./DuraAce	700/20 (451 or 406)	66-69/22/13/#27	Either moulded or mesh
$6000	**Turner TLG**	Carbon fiber/USS	Ultegra	26/20	NA	Moulded
$7999	**Boulder Polaris**	Ti full susp./ASS	Rohloff/Campy	700/20	NA	Mesh back/moulded base

SWB

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$795	**Lightning Thunderbolt**	Steel/ASS	Shimano Acera mix	26/20 or 16	40/21/NA/NA	Mesh back/base
$999	**Rans Rocket**	CroMo/ASS	SRAM 7.0 Mix	20/20	41/23/19/#29	Mesh back/moulded base
$1095	**Vision R40**	CroMo/USS or ASS	Shimano Deore mix	26/20 or 16	40/24/24/#30-34	Mesh back/moulded base
$1295	**Vision R40 MWB**	CroMo/USS or ASS	Shim/SRAM 3x7mix	26/20	54/24/26/#37	Mesh back/base
$1249	**Linear**	Alum. extrusion/USS	24-spd. mix	26/20	NA	Mesh back/moulded base
$1350+	**Turner T-Lite& Deluxe**	CroMo/USS	NA	26/16 or 20	38/22/NA/#25-28	Moulded
$1399	**Rans Vivo**	CroMo full susp./ASS	SRAM 7.0 mix	20/20	61/23/19/#37	Mesh back/moulded base
$1399+	**Lightning Phantom**	CroMo brazed/ASS	Shimano Deore mix	26/20	41/19/NA/#27	Mesh back/moulded base
$1399+	**Burley Django**	CroMo/ASS	SRAM 5.0/Shimano	26/20	40-44.5/23/25/#30	Mesh back/moulded base
$1495	**Bacchetta Giro**	CroMo ovalized/ASS	Shimano Deore LX	26/20	47/23/NA/#28	Mesh back/moulded base
$1599	**Rans V-Rex**	CroMo/ASS	SRAM 7.0 mix	26/20	43/24/26/#29	Mesh back/moulded base
$1695+	**Vision R44/45**	CroMo/USS or ASS	LX mix or XT miix	26/20 or 16	41/24/24/26+	Mesh back/moulded base
$1695+	**Vision R50/54/55**	CroMo full susp.	Deore, LX or XT	26/20	40/24/24/#27	Mesh back/moulded base
$1700	**Bacchetta Strada**	CroMo ovalized/ASS	Shimano 105	26	47/24/32/#28	Mesh back/moulded base
$1735	**Rotator Tiger**	CroMo brazed/ASS	SRAM/Shim. mix	20/20	41/15/NA/#30	Mesh back/base
$1795	**Greengear Sat R Day**	CroMo/ASS or USS	SRAM 3x7 mix	16 349	40/26/24/#31-33	Mesh back/moulded base
$1750	**HP Velo Street Machine**	CroMo full susp./USS	SRAM 9.0 mix	26/20	41/25/27/#NA	Euro moulded
$1799	**Burley Hepcat**	CroMo /ASS	Shim. Deore/105/Ult.	26/20	40-44.5/23/25/#29	Mesh back/moulded base
$1800+	**Optima Dolphin Sport**	CroMo/ASS	Neos or RX100 or XT	20/20	NA	Euro moulded
$1900	**Optima Orca/Condor**	CroMo/ASS	SRAM/Shimano mix	26/26	NA	Euro moulded
$1900	**Optima Lynx/Dragon**	CroMo/ASS	SRAM/Shimano mix	26/20	NA	Euro moulded
$1995	**Barcroft Dakota**	CroMo/ASS	Shimano XT/105 mix	26/20	47/21/24/#28.5	Mesh back/moulded base
$1995+	**Vision R60 Saber**	CroMo/ASS	105 or Ult.or DuraAce	650c	40/29/29/#26	Mesh back/moulded base
$2095	**Barcroft Virginia GT**	CroMo/ASS	SRAM/Shimano mix	26/16	48/19/24/#28.5	Mesh back/moulded base
$2200	**Reynolds Wishbone**	CroMo/ASS	Campy/Shimano mix	26 or 700 or 26/20	Varies/#27	Moulded
$2299	**Boulder Sierra**	CroMo/ASS	Shimano Ultegra	26/20	NA	Mesh back/moulded base
$2350	**Angletech Giro ST27**	CroMo ovalized/ASS	High end mix	26/20	47/23/27/#28	Mesh back/moulded base
$2400	**Optima Baron Lowracer**	CroMo/ASS	NA	NA	NA	Euro moulded
$2435+	**Wicks JT Cruiser/Hed**	Aluminum/USS	Ultegra	700/20	NA	Moulded or Hybrid
$2495	**TerraCycle TerraZa**	CroMo/ASS	105/SRAM 3x7 mix	20/20 BO	43/23/24/#32	Mesh back/moulded base
$2599	**Longbikes Eliminator**	CroMo/ASS	Shimano 105/XT	26/20	NA	Mesh back/base
$2595	**HP Velo Speedmachine**	Alum. full susp./ASS	SRAM/XT mix	26/20	47/17/26/#NA	Euro moulded
$2600	**Lightning P-38**	CroMo brazed/ASS	Shimano LX/105 mix	700/20	36.5/21/NA/#27	Moulded

SWB *Cont'd*

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$2699	**Angletech V-Rex GT81D**	CroMo/ASS	SRAM9.0 SLDualDrive	26/20	43/24/26/#28	Mesh back/moulded base
$2750	**Lightning M5**	N/A/lowracer/ASS	NA	N/A	NA	Euro moulded
$2900	**Burrows Ratcatcher 9**	Aluminum/ASS	SRAM 9.0/ Shim. XT	26/16	NA	Moulded
$3500	**Reynolds Redundant**	CroMo/ASS	Mix	26 or 700	NA	Moulded/upright
$3800	**Bacchetta Aero**	Titanium/ASS	Shimano Ultegra	650c	47"/22/31/#21	Euro moulded (M5)
$3699	**Boulder Galaxy**	Alum. full susp./ASS	SRAM/Shimano	20/20	42/23/27/#32	Mesh back/moulded base
$4000	**Angletech Altitude GL81**	Alum. full susp./ASS	SRAM 9.0 DualDrive	20/20 BO	42/23/27/#32	Mesh back/moulded base
$4250	**Rotator Tiger Ti**	Titanium/ASS	NA	20/20	41/15/NA/#21	Full mesh
$4599	**Angletech MC2 SHO CT**	CroMo brazed/ASS	Dura Ace/SRAM/Hed	26/20	42/23/23/#27	Full mesh
$5000	**Turner Carbon**	Carbon fiber/USS	Ultegra	26/20	NA	Moulded
$5300	**Lightning F40**	CroMo brazed/ASS	Shimano 105 mix	700/17 AM	42+/18/NA/#32-34	Full mesh
$5100	**Lightning R84**	Carbon fiber/ASS	Campagnolo	700/20	42-47/18"/NA/#20-22	Full mesh

Trikes—Delta

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$699	**Sun EZ3**	HiTen/ASS	Shimano/Sunrace mix	20/16	NA	Mesh back/moulded base
$1750	**EZ Quad**	HiTen/ASS	Shimano/Sunrace mix	20/16	NA	Mesh back/moulded base
$2295	**Hase Kett Weisel**	CroMo susp./USS	27-speed mix	20	NA	Mesh back/moulded base
$2329	**Lightfoot Roadrunner**	CroMo/ASS	SRAM/Shimano	NA	NA	Moulded
$2495	**Penninger Traveller**	CroMo/ASS	Shimano LX/Phil	3x20	NA	Mesh back/base
$2695	**JTB Raven**	CroMo folding/USS	SRAM/Shimano mix	3x20	NA	Mesh back/base
$2795	**Penninger Voyager**	CroMo/USS	SRAM/Shimano/Phil mix	3x20	NA	Mesh back/base
$2990	**Hase Lepus**	CroMo foldable/USS	Shimano 27-speed mix	3x20	NA	Mesh back/moulded base

Trikes—Tadpole

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$2295	**WizWheelz TerraTrike**	CroMo/USS	Shimano 18-spd mix 20	3x20	41/11/14/#34	Mesh back/base
$2295	**Sidewinder Pro**	HiTen/RWS USS	21-speed	3x20	NA	Mesh back/base
$2394	**Lightfoot Trilobike**	CroMo/ASS	SRAM/Shimano	NA	NA	Moulded
$2557	**Hotmover**	CroMo/USS	SRAM Sora	NA	NA	Mesh back/base
$2700	**Catrike Road**	Aluminum/USS	Shimano 27-speed mix	3x20	NA	Mesh back/base
$2700	**Leitra Trike** (w/o body)	CroMo/USS	SRAM	3x20	NA	NA
$2950	**Greenspeed GTR Touring**	CroMo/USS	SRAM/Shimano mix	3x20	37.4/12/17/#31	Mesh back/base
$2950	**Greenspeed GTJ 16/16**	CroMo/USS	SRAM/Shimano mix	3x16	35.4/10.3/15/#31	Mesh back/base
$3000	**Greenspeed GTH Hand**	CroMo/USS	SRAM/Shimano mix	3x20	37.4/12/17/#40	Mesh back/base
$3050	**Greenspeed GTO**	CroMo S&S/USS	SRAM/Shimano mix	3x20	38.4/10/15/#40	Mesh back/base
$3050	**Greenspeed GTO 16/16**	CroMo S&S/USS	SRAM/Shimano mix	3x16	35.4/10.3/15/#33	Mesh back/base
$3100	**Wicks Trimuter**	CroMo/USS	SRAM/Shimano mix	3x20	NA	Mesh back/base
$3300	**Optima Rider Speed**	CroMo/USS	SRAM/Shimano	3x20	NA	Moulded
$3350	**Greenspeed GTE Exp**	CroMo/USS	SRAM/Shimano mix	3x20	44/12/17/#44	Mesh back/base
$3350	**Greenspeed GTC Suitcase**	CroMo/USS	SRAM/Shimano mix	3x20	37.4/12/17/#40	Mesh back/base
$3500	**Greenspeed GTS**	CroMo/USS	SRAM/Shimano mix	3x20	41.3/10/16/#36	Mesh back/base
$3600	**Greenspeed GTX 16/16**	CroMo/Alum./USS	SRAM/Shimano/Schlumf	3x16	41/7.5/15/#33	Mesh back/base
$3600	**Angletech TriSpeeder**	CroMo/ASS	Shimano mix	3x20	N/A/21/13/#39	Mesh back/base
$3610	**Trice Classic**	CroMo brazed/USS	Shimano Deore/LX/XT mix	26/20	39.4/12/17/#38.5	Mesh back/base
$3718	**Trice Explorer**	CroMo brazed/USS	Shimano mix	3x20	39.4/N/A/15/#38.5	Mesh back/base
$3779	**Trice XL**	CroMo brazed/USS	Shimano Deore/105/XT mix	3x20	39.4/8/13/#38.5	Mesh back/base
$3950	**Windcheetah**	Alum. bonded/stick	NA	NA	NA	Moulded
$4000	**Angletech Quadraped**	CroMo/ASS	Shimano mix (hand & foot crank)	3x20	N/A/21/13/#44-47	Mesh back/base
$4000	**Greenspeed GLR 16/19**	CroMo/USS	SRAM/Shimano	16/19	46.5/7.5/NA/#31	Mesh back/base
$4977	**Trice Mini**	CroMo brazed/USS	SRAM/Shimano mix	16 349	32.5/8.5/14/#27.25	Euro moulded
$5250	**Leitra Velomobile** (w/body)	CroMo/USS	SRAM	3x20	NA	NA
$5300	**Trice Micro**	CroMo brazed/USS	Shimano Ultegra/Dura Ace mix	16 349	41.3/4.5"/14"/#29	Euro moulded

Tandems

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$2500	**BikeE E2**	Alum. rear susp./ASS	SRAM ESP	20/16	NA	Mesh back/moulded base
$3695	**Barcroft Columbia**	CroMo/ASS	Shimano LX/XT/105	20/20	55/29/NA/#46	Mesh back/moulded base
$3495	**JTB Raven Double**	CroMo/USS	SRAM/Shimano mix	4x24	NA	Mesh back/base
$3795+	**Double Vision**	CroMo/USS	LX/XT mix or XT mix	26/20	70/24/25/#52-54	Mesh back/moulded base
$3999	**Rans Screamer**	CroMo/ASS	SRAM/Shimano mix	26/20	75/24-26/24-26/#47	Mesh back/moulded base
$4499	**Angletech ScrmerGLX27**	CroMo/ susp fork/ASS	High-end mix	26/20	75/24-26/24-26/#47	Mesh back/moulded base
$4599	**Rans Screamer TR**	CroMo S& S/ASS	SRAM/Shimano mix	26/20	75/24-26/24-26/#47	Mesh back/moulded base
$5999	**Boulder Sirius**	CroMo full susp./ASS	NA	26/20	NA	Mesh back/moulded base

Trike Tandems

Price		Frame/Steering	Components	Wheels	WB/SH/BB HT/WT	Seat Style
$5400	**Greenspeed GTT**	CroMo/ASS	Shimano mix	3x20	90/10.3/16/#66	Mesh back/base
$5500	**Greenspeed GTT 2S**	CroMo S&S/USS	Shimano mix	3x20	90/10.3/16/#66	Mesh back/base
$5400	**Greenspeed GTV CVT**	CroMo/USS	Shimano mix	3x20	90/10.3/16/#66	Mesh back/base
$6652	**Trice Expedition**	CroMo brazed/USS	SRAM/Shimano mix	20	96.5/12/14.5/#77	Mesh back/base
$6836	**Trice X2 Trike**	CroMo brazed/USS	SRAM/Shimano mix	20	96.5/12/14.5/#77	Mesh back/base

KEY: Alum.—Aluminum; **CroMo**—Chome-moly aircraft steel; **BO**—Bolt on rear hub; **RS**—Rear Suspension; **FS**—Full Suspension; **RR**—Rear; FT—Front **Mesh back/base**— Full sling mesh suspended between aluminum or steel frame, also called "hammock."; **Mesh back/moulded base**—Full sling mesh + foam base; **Moulded**—A fiberglass, composite or aluminum shell covered with foam; **Euro moulded**—A moulded shell with lumbar curve;

NOTE: A few manufacturers do not participate in our Season Preview and their specs are not complete or may not be listed. We reserve the right to exclude any manufacturer for lack of cooperation, ethical or financial concerns. RCN has an open door policy. We would love to include every manufacturer and invite all to contact us.

THANK YOU: A special thank you to our intrepid Interbike staff of John Riley, Ron Schmid with help provided by Zach Kaplan. And a special THANK YOU to those manufacturers who spend time with the RCN Interbike crew and especially those actually still take the time to mail in your new year specs, prices, updates and photos each Fall. Several manufacturers send us nothing, so there is bound to be some dated or missing information.

Recumbent Reviews
& Editor's Choice

Compact Long Wheelbase 2002

BikeE CT
The Good: Refined look; excellent quality; user friendly
The Bad: Not a fast bike; seat downgrade—new *Comfort Seat* is not as comfy as the *Sweet Seat*; 2002 price increase; made in Taiwan.
The Bottom Line: A refined recreational recumbent bicycle

BikeE AT
The Good: CT + Sweet Seat + plush rear suspension
The Bad: High pivot can mean for pogo; taller/heavier riders should want to consider the XL/XXL; price increase; made in Taiwan.
The Bottom Line: The CLWB by which all others are judged.

BikeE RX *Editor's Choice Runner Up*
The Good: Best BikeE model; best BikeE steering geometry, ride and handling; built in Corvallis, Oregon, USA.
The Bad: High pivot point rear suspension; pogo for larger/taller riders; front suspension cannot be used with fenders; BikeE sizing needs refining; a big price jump; not a roadie racer.
The Bottom Line: A very nice CLWB; An excellent bike if you buy the correct size.

Cannondale Easy Rider *Editor's Choice Best CLWB*
The Good: Built in the USA quality; excellent low pivot point/no pogo/smooth rear suspension; excellent front suspension; finest finish quality we've seen on a recumbent (our test bike is here)
The Bad: Expen$ive; mid-drive shifting not as intuitive; heavy
The Bottom Line: The finest CLWB we've ridden. The ultimate comfort/commuter recumbent. Lets hope Cannondale comes through with a SWB and LWB. Watch for our review in RCN#68 or 69.

Cycle Genius 24 *New (watch for review in 2002)*
The Good: Comfy and unique full mesh seat with springs; reliable drivetrain; excellent value; good CLWB performance.
The Bad: Rough hard-tail ride; low psi tires (base model; we had a blowout); square/round tube combo; mediocre welds and odd colors.
The Bottom Line: This new model rides like a MWB, or a SWB without a boom. It has a higher pedal heights than most; rides and handles nicely (can be tail heavy with a tall rider); a good bargain, though keep in mind; new company, new model...

Sun EZ1 *Best Buy CLWB (both)*
The Good: Comfy seat; great Easy Racer bars, excellent handling.
The Bad: Somewhat crude look (square tube and cut off rear end)
The Bottom Line: This is the best value in entry level recumbents and the bike rides and performs nicely. The SC Lite is worth the upgrade cost. It is lighter weight and has better components.

Long Wheelbase 2002

Burley Limbo
The Good: Excellent build quality; great company; excellent value.
The Bad: Tall pedal and seat heights; remote ASS adds complexity; adding a fairing is more difficult; suspension may pogo; seat back is shorter than most; seat base is firm; not a performance bike.
The Bottom Line: The Limbo is a comfortable recreational LWB. It has had refinements since our review which is reported to improve suspension performance.

Easy Racer Tour Easy *Editor's Choice Runner Up*
The Good: The LWB by which all others are judged; best handling and road feel; low seat and pedal height; 5-frame sizes; fairing designed for bike; great all arounder.
The Bad: Model showing its age; could use some updating; 700c wheel on touring model; expen$ive.
The Bottom Line: This is still the best LWB ASS around.

Easy Racer Gold Rush/TiRush *Editor's Choice Best LWB (both)*
The Good: Imagine a bike even better than the Tour Easy; improved components; smoother ride; better performance; optional foldRush frame (either model); TiRush frame built by Delaire/Rotator; the Gold standard; what's not to like.
The Bad: Aluminum doesn't bring a premium like this in the wedgie world these days; expen$ive
The Bottom Line: This bike has years of refinement and is a favorite among owners, riders and even many dealers. All Easy Racer models are reliable, robust and refined.

Lightfoot Explorer/Ranger *New (watch for review in 2002)*
The Good: Custom LWB with low pedal height built by craftsman in Montana; 3-seat options; utility, EV and trike options available; delivered assembled in a crate.
The Bad: Standard seat looks somewhat dated; difficult to find/test ride—sold mainly direct.
The Bottom Line: Rod Miner and company build cool utilitarian designs.

Sun Easy Sport *Best Buy LWB*
The Good: Combine the EZ1 + Tour Easy + curvy tube cruiser and this is what you get; CroMo cruiser LWB ASS for under $900!
The Bad: A bit tall; a bit heavy; one size-frame; too big of a gap between EZ Sport and Tour Easy.
The Bottom Line: This should be a best seller for 2002. If you are a casual rider who loves the Easy Racer style, but not the big prices or small (CLWB) wheels—this is your bike.

RANS Stratus
The Good: Classic LWB ASS; smooth ride; user-friendly performance.
The Bad: Only two frame sizes; handlebars/stem needs an update; made in Taiwan.
The Bottom Line: An excellent bike, and superior value.

RANS Tailwind/Wave
The Good: Great riding; great ergonomics; great seat
The Bad: Tall chainrings (TW); mediocre front shifting (TW); one-size frame; heavily loaded rear end (could use a 2nd size).
The Bottom Line: A fine bike if you fit the one-size frame); the Wave is a superior bargain and has better front shifting.

RANS V2
The Good: LWB with higher pedal height—SWB riding position; RANS Seat; this model gets the new seat track.
The Bad: Only two frame sizes; lacks refinement compared to competition; made in Taiwan.
The Bottom Line: Best for SWB lover wanting a performance LWB.

Rotator Pursuit/Tiger
The Good: A unique and low LWB ASS; passive suspension; lots of gears; cool fairing options; great builder (Steve Delaire); 5-seat sizes with varying heights & widths; optional Ti frame, Rohloff 14-spd. hub, 20-inch, 26-inch (Pursuit) or 700c (Pursuit) rear wheels.
The Bad: Hose clamp seat attachment; frame flex/passive suspension; mid-drive more complex
The Bottom Line: This is a hand crafted fun bike with lots of personality; for the rider who wants something different; active racers; lots of custom options/possibilities.

Short Wheelbase 2002

Boulder Galaxy/Angletech Altitude
The Good: A high end full suspension SWB; a very comfortable bike to ride; packs for travel; excellent quality; active suspension.
The Bad: RANS seat transition (old or new?); rather extreme ergonomics for a touring bike (high pedal height); doesn't come apart as easily as you'd think it should.
The Bottom Line: A SWB dream bike—with a ride to match.

Bacchetta *New*
The Good: Like a V-Rex but more extreme; modern designs; new enthusiast built company (Mark Colliton & John Schlitter).
The Bad: New Company; built in Taiwan; prototypes shown around the country are built in the USA and are not production models.
The Bottom Line: A great new line of higher pedal height SWB ASS recumbents. We look forward to road testing these models.
Note: The Strada and Aero should be excellent additions to the performance SWB market. These models are best suited for laid back, athletic riders who are tall.

Barcroft
The Good: Small company; bikes built by Rotator; lower—more performance oriented American SWB ASS; performance touring.
The Bad: RANS seat transition (old or new?); laid back seats; the new contract builder is Rotator.
The Bottom Line: Bill Cook's Barcroft offers some very nice SWB recumbents. Enthusiast owners seem to love them. An excellent reputation.

Burley Hepcat/Django *Editor's Choice Best SWB (both)*
The Good: Excellent build quality; great company; excellent value; lower—more performance oriented American style SWB.
The Bad: Tall pedal and seat heights; very reclined seats and steering mast; seat back is shorter than most; seat base is firmer than most; stiff ride with seat brace/passive suspension without.
The Bottom Line: Burley is a great company with wonderfully built bikes; These are the best models in their line; can be a difficult bike to dial-in to perfection (can be time consuming proper set up and dial-in). The value alone should make these best selling bikes. Watch for our upcoming review.

HP Velo Street Machine
The Good: Very European; laid back seat; USS or ASS; racks, fenders and lights; optional tailbox and great accessories; very friendly company that has worked hard for USA market share; the easiest Euro company to deal with.
The Bad: Heavy; a bit extreme; Euro seats don't work for everyBODY; frame made in Taiwan.
The Bottom Line: This is becoming a very popular bike for those who love the Euro look and ride.

Haluzak Horizon
The Good: Excellent build quality; slow handling SWB USS; cantilevered rear end (passive suspension).
The Bad: Tall pedal and seat heights; closed riding position (upright seat + high pedal height); tall bikes with wide USS = not a great performer; does not track steady with a load; mediocre service; expen$ive.
The Bottom Line: Communications can be difficult (especially if there are problems); our advice is to just choose a good dealer to work with.

HP Velo Speed Machine
The Good: Very European; laid back seat; streetable/tourable lowracer; choice of ASS bars; lots of options.
The Bad: Euro bikes (and seats) don't work for everyBODY.
The Bottom Line: This has to be the coolest SWB semi lowracer on the planet!

Lightning P-38
The Good: The performance SWB by which all others are judged; basis for the F40; owners seem to love them.
The Bad: Closed riding position (upright seat + high pedal height); expen$ive; mediocre company reputation; find a good dealer to deal with.
The Bottom Line: Time proven performance SWB designs.
Note: The T'Bolt is a great bargain, though we have never had one to test. The Phantom is a simpler version of the P-38 that is built by Rotator and may be the best choice for value added performance. The R84 composite has a less than stellar durability record.

RANS Rocket *Best Buy SWB*
The Good: An incredibly sweet handling bike; an exceptional value.
The Bad: Heel/front wheel interference; tall chainrings = mediocre front shifting; could use a 2nd frame size; made in Taiwan; RANS has had seat, paint and seat-slippage problems with Taiwan models.
The Bottom Line: This is an excellent SWB bargain.

RANS V-Rex
The Good: Classic SWB design; Triangulated frame; A refined all arounder SWB; new seat slider mechanism.
The Bad: Taller bike; made in Taiwan; previous paint and seat woes.
The Bottom Line: This is an excellent SWB ASS.

TerraCycle TerraZa
The Good: Excellent handling and steering geometry; very fine quality/custom build; lots of unique details; best SWB stem/riser/handlebars in the biz (now available for the aftermarket); Pat Franz is great to deal with.
The Bad: Odd frame design; RANS seat transition (old or new?).
The Bottom Line: This is an excellent touring SWB. These limited production bikes are hand crafted for their owners.

Turner T-Lite
The Good: Low seat + low pedal height (16-inch wheeled model); relatively fast USS bike, though not as slick as the sales pitch.
The Bad: Limited seat adjustment; marginally comfortable seat; bearingless chain idler; unreliable component spec; lacks refinement.
The Bottom Line: Our most recent test of a T-Lite was problematic. This is the original Hypercycle derivative. Wicks is now building/selling a similar model with upscale specs and a nicer built frame.

Vision R40/44/45 *Editor's Choice Runner Up*
The Good: 2002 model best Vision SWB ever; new frame design; ASS or USS; new boom/chain adjuster; built in the USA; new MWB model and 16-inch wheel model for shorter riders.
The Bad: More forward center-of-gravity; limited sizing; quicker handling than some; seat horn and no seat lumbar curve.
The Bottom Line: The bikes are very good quality, though the owners seem less passionate about their bikes than perhaps some other groups.

Tandems 2002

BikeE E2 *Best Buy*

The Good: The E2 is in its finest form to date; a great recreational tandem for a family or newbie couple; fine quality; good updates for 2002.

The Bad: The E2 does not have a stellar reputation, though received a good review from us; odd steering geometry; price increase for 2002; not a performance tandem.

The Bottom Line: You have to have a sense of humor to own an E2 due to the unique appearance.

Double Vision

The Good: A fine USS tandem.

The Bad: Redesigned a few years back; we haven't ridden it yet; The Double Vision is not as highly thought of as the competition.

The Bottom Line: A fine USS tandem with a lower stoker seat.

RANS Screamer *Editor's Choice Best Tandem*

Good: A fast, excellent handling tandem; a refined bike

The Bad: Built in Taiwan, but assembled in KS, USA; not perfect, but still the best tandem; expen$ive.

The Bottom Line: The Screamer is tried and true. A good performer and a robust and refined recumbent.

Trikes 2002

Trikes—Delta

The builders who are movers and shakers are Penninger, Hase Spezialraeder and Lightfoot. Penninger builds comfort recreational trikes; Hase builds the same as well as offering touring and foldable options; Lighfoot builds robust utility commuter vehicles and recumbent trucks/pedicabs. We haven't heard any complaints about these manufacturers.

Sun EZ3 *Best Buy*

Lightfoot *Editor's Choice Best Delta*

Trikes—Tadpole

Greenspeed and WizWheelz are the only companies who've sent us tadpole testers recently. We have been happy with both. Wiz offers excellent values. Greenspeed is the most respected builder of trikes in the world.

Though we have never ridden one, Windcheetah has always built the high performance trikes, followed closely by Greenspeed. As for full enclosed commuter "velomobiles" the only real choice is a Leitra. This Danish design has been around since the 1980's. We are told that it is very refined. We hope to eventually test a Leitra.

Our best trike selection advice is to use common sense: Consider your budget, ergonomics (pedal height and seat recline), and what you plan to use the trike for. Consider company reputation, what enthusiasts think about their trikes and how long they have been in business. Be cautious of Internet bargains where you may be the very first customer. Carefully consider shipping costs, customs duty with International dealings (shipping can be VERY expensive, but duty may be less than a two-wheeler). We hope to bring you more trike tests in the future.

WizWheelz: *Best Buy*

Greenspeed GTO: *Editor's Choice Best Tadpole* ◆

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Inquiries via email only. Please tell us your previous experience, how much you charge, whether you are Mac or PC, have internet access and prefer email or hard copy editing. Please include bids on 40 page (current size), 32 page and 24 page (possible future monthly sizes). RCN runs about 25%-30% advertising <bob@recumbentcyclistnews.com>. Please do not reply after March 1 2002

Secrets for Selecting a Recumbent

This recumbents list represent the essential design styles of recumbency. We suggest that you ride the following bikes in this order.

1. LWB ASS
2. CLWB ASS
3. Trikes if you are interested
4. SWB ASS (American style)
5. LWB or MWB USS
6. SWB USS

Now, go back and ride them all again.

Take your top 2-3 choices, and go for extended rides, including steep climbs, descents, as well as flat land cruising.

Remember to ride lots of bikes, and ride the leading candidates at least twice and on longer rides with more varried terrain. ◆

Recumbent selection advice

There is a lot to know about recumbent selection. It is a topic that can be studied as deeply as one might like. Your best bet is to go through the following steps to help you find the recumbent of your dreams.

1. Learn about recumbents before you buy one.
2. Set an absolute bottom line budget.
3. Make a list of bikes that you like the looks of.
4. Determine if these bikes fit your body type and size.
5. Is the bike a good choice for where you ride (terrain).
6. Visit recumbent websites and order brochures/catalogs.
7. Join or read the Internet newsgroup/mailing lists:
   alt.rec.bicycle.recumbent
   hpv mailing list at www.ihpva.org
8. Connect with a local rider group.
9. Visit some recumbent dealers. You can find specialists in RCN and dealers through the manufacturers (try RANS, Vision and BikeE websites).
10. Ride a bunch of bikes And then go back and ride them again. We suggest you take the ones that are in the final running for extended test rides.

Recumbent Performance

by Bob Bryant

It is true that recumbents hold most of the human-powered speed records. They are aerodynamically superior to conventional bicycles: less frontal area means less wind resistance = more speed.

Recumbent performance in the real world can vary dramatically by rider and bike type. For a fit roadie, it will take a fast recumbent to see any advantage at all. Most recumbent bicycles are often a bit slower than their upright counterparts. For a truly fast recumbent look for high performance/racing models from manufacturers with race teams, records and regularly enter race events.

Recumbents have a different power-curve than upright bikes. Aerodynamic recumbents tend to be very fast on the flats and rolling terrain. Most recumbents and riders are slower up hills because you can't stand on the pedals to climb. A recumbent rider who claims to be faster on the hills on their recumbent is usually a fit athlete.

We seldom see recumbents riding in packs with roadies. When they are, they are often treated poorly—or it is a very rare situation. The different power-curve drives the roadies crazy (especially in hilly areas)

Recreational enthusiasts may see performance increases from a different perspective. You may be slower up hills, and faster or the same on the flats (depends on the bike), but if you are comfortable, you can stay on the bike longer, ride farther and in less time. The hidden benefit of recumbents is that you will arrive feeling good with no pain. If you ride longer and farther, you will become in better shape and your average speeds increase. We call this the *comfort increases performance theory*.

The bottom line is that even if you buy a performance recumbent, you may or may not be as fast as you were on an upright.

PERFORMANCE BY BIKE TYPE

One of the unique aspects of recumbent bicycles is the experimental design nature of them. Recumbent enthusiasts quickly split off into their own camps and state their strong preferences for one design or another. I cannot tell you which will work best for you, but this outline may help. Strongly consider ergonomics and your body type as several of these more extreme designs are best suited for young fit athletes.

Faired Lowracer (M5)—This is a real racing machine. I've only seen them in pictures, but have to believe that it is the fastest production recumbent on wheels.

Lowracer—If you can handle the lowracer ergonomics and feel safe at this low height, and have mostly flat terrain, and the model isn't too heavy, these can be very fast bikes. Though these are the current buzz, they are still relatively rare and do not work for everyBODY.

Highracer—The highracer is gaining popularity in the USA with bikes like the Vision Saber, the Pinto Aerocycle and the upcoming Bacchetta Strada. This design was popular in Europe a dozen or so years ago, but has lost ground to the lowracers (perhaps due to windy conditions). The theory is that if you get the bike light enough, and aero enough, and use enough state-of-the-art roadie gear (light forks, racing tires, etc), and with the fast rolling big wheels, you'll go really fast. So far highracers really don't have any speed records to speak of, and their builders's don't really have racing teams per se. George Reynolds builds a dual 700c racer that sort of fits in between the low and high racer categories.

Faired SWB (F-40)—This is a fully faired SWB ASS with nose and tail sections and soft body panels in between. The F-40 is in a league of its own. With a center-of-gravity higher than other performance bikes (though lower than many American SWB), we are told that the F-40 can be a handful in crosswinds.

LWB ASS/fairing—The regular folks secret to user-friendly performance is the LWB ASS with a front fairing. This is the most user-friendly performance recumbent design there is. With the center-of-gravity down low, and the optional Lexan fairings, these bikes can move.

Euro SWB—The Euro style SWB usually have a very laid back moulded shell seat. Theoretically, these should be faster than the American (more upright) SWB. Which will perform better depends on which one is the most comfortable for you.

SWB ASS/fairing—A fast SWB ASS with a tailbox or Lexan front fairing can be nearly as fast as a LWB ASS/Fairing. For some riders, possibly faster. This seems to be mostly dependant on which design/riding position the rider prefers.

CLWB/LWB/SWB USS—These are fine bikes with an emphasis on comfort.

Entry level CLWB—These are primarily recreational models for commuting, utility and perhaps touring. They are not designed for speed, but for comfort and fun.

Trikes—It is difficult to generalize about trike performance. There are low and fast performance trikes, and heavy and slow utility delta trikes. Trikes are generally slower than the comparable enthusiast level recumbent two wheeler.

SPEED DEVICES

The two primary manufacturers are Mueller and Zzip Designs. It is best to check which fairing fits the bike that you are buying. Some fit better than others. The best are those designed to fit the specific bike. LWB fairings are the most effective (good for about 10%+/-). SWB/trike large fairings often create turbulence between the rider and fairing. CLWB models are often too high upright to make much of a difference.

Most owners will tell you that they have experienced some benefit from their fairing. Even if it is just weather protection from the cold air and wind in the off season. If you are willing to make your own mounts, you can save some money by purchasing "experimenter kits." Some manufacturers do custom fairing such as Rotator in the USA and HP Velo and others in Europe (mainly tailboxes). Tailboxes and front fairings can actually be homebuilt of Coroplast. See RCN #65 and the RCN website links.

Full bodies/streamliners—The only commercially available bodies are available from Lightning (F-40) and the M5 (lowracer). These can be very fast, though require practice in aerodynamic control technique. European trike builders Leitra and Twike offer three-wheeled commuter vehicles with full weatherproof bodies.

Keep in mind that riding a streamliner is the most advanced type of recumbent. Knowledge of flying, sailing, bike mechanics and an intimate relationship with your bike are important. You may crash more often, but the speeds attainable are incredible.

Tail boxes—Most tailboxes are owner built of coroplast (plastic cardboard). With sliding seat adjustments and different recline angles, a production box would be difficult to make. The one exception to this is the Euro moulded shell seat. Companies like M5 and HP Velo offer tail boxes. In the USA Reynolds Weld Lab and Rotator offer tailbox options (Rotator sells tailbox assembly tape as well). Tailboxes can be good for an up to 10% speed advantage. On a SWB or lowracer, these can be more effective than a front fairing.

DESIGN TRAITS THAT CAN SPEED YOU UP

✓ Big wheels with skinny high pressure road racing tires (or some fat performance tires)
✓ Fairings or tailboxes that are designed to fit the bike
✓ Effective aerodynamics (with or without fairing)
✓ Low designs (level of safety determined by rider)
✓ An effective performance design that is comfortable for you
✓ Designs known to be fast
✓ High pedal heights for some; Euro/lowracers
✓ Low pedal heights for others; LWB ASS (w/Lexan fairing)

DESIGN TRAITS THAT CAN SLOW YOU DOWN

✓ Small front wheels 305mm or 349mm front wheels
✓ Small drive wheels (anything other than 26" or 700c)
✓ Very Tall or wide bikes
✓ Non-standard drivetrains (mid-drives, internal hubs, etc.)
✓ Heavily loaded front-ends
✓ Heavily loaded rear-ends
✓ Heavy bikes
✓ Flexible frames (even if lightweight)
✓ USS Steering that is too wide

PERFORMANCE CAUTION

Recumbent performance superiority has to be the most fibbed about benefit of recumbent bicycle ownership. The HPV speed records do not always equate to real world performance. Be especially aware if a builder has mysterious reasons why his seemingly generic design is faster than all the rest. Real performance reputations are carefully earned. Ask about race records and real data. Performance testing is difficult because we're not talking about Miatas and Corvettes. We're talking about human bodies pedaling bicycles—often in unique and different body positions (than standard bicycles). Coast down tests can favor heavier bikes; wind tunnel testing do not account for real world imperfect terrain and the motion of pedaling; other claims can be disputed as ergonomics, seats and steering types and even frame designs (very stiff or passive suspension/flex) can work better or worse for different body types.

I am faster on a recumbent clearly because I can ride farther—because I am more comfortable. Sure, a lowracer might be faster around the track, but a LWB ASS or even a SWB USS with a comfy full mesh seat may be the best after 8 hours on the road.

Keep in mind that another aspect of performance is where you ride. Those who climb a lot may want an upright seat back. Those in windy conditions may want a lower bike with a laid back seat. Those on rough roads may want bigger wheels (or even fatter tires). Those in high trafficked areas may want a higher bike with a more upright position. It all comes down to common sense and finding a bike that works well for you, where you live, ride and your local terrain and wind/weather conditions.

HILL CLIMBING

In my experience climbing with a reasonable weight, moderate pedal height SWB ASS recumbent is about as efficient as you can get. The more extreme higher pedal heights bikes take more practice, but I suppose can be even better once you are accustomed. Tall, very laid back or very high pedal height bikes can make climbing more difficult, especially in low speed, steep climbing. Climbing a LWB up a grade at very low speeds takes skill because the bike is long.

Bikes with very open riding positions do not climb as well. CLWB tend to climb slower. If you are on the wrong frame size or too tall/heavy for your one-size fits all frame, you may be popping mini-wheelies with each climbing pedal stroke. This is a good indication to trade-in your bike.

Our best advice for optimum climbing is to ride which performance oriented bike works for you and TRAIN FOR CLIMBS. Your personal fitness is the key. Riding hills daily and doing interval training on stationary recumbent exerciser are the keys to fast recumbent climbing.

CLIMBING STYLES

With a recumbent you cannot fake it like you can on an upright (standing on the pedals for power). For effective climbing, you must develop your aerobic power and recumbent leg muscles. If you still want to try and fake it, and are a low mileage rider, we suggest a lower pedal height bike. While you still need recumbent muscle training, it is not as necessary as the more extreme positions (laid back seats and/or high pedal height).

Here are two types of recumbent climbing techniques:

Granny spin—This is the simple, easy and slow way up hills on a recumbent. If you have a nice flat run or downhill, build up speed and charge up the hill. Just as you start losing momentum—drop your bike into granny low and spin it up the hill. If safety permits, try a zig-zag climbing pattern to take some stress off of your direct assault on the hill. Some find pushing into the lower back of the seat, or pulling on the handlebars and even pushing on your knees to be helpful. Try and find a method that works for you and your bike. Note: Having a granny low of <25 gear inches is preferable.

Mid-gear push—If you are a fit athlete or wannabe, you need to find a perfect mid gear for your triple crank that allows you to continue to push up hills in the mid-range rather than dump into granny low. This requires both strength training and aerobic fitness—though you'll climb faster. A word of caution is in order as riding of this type can cause injuries if you are not properly trained.

Keep in mind that not all bikes and not all riders can use these methods. We're heard of riders pushing too large of gears or those with inadequate training, weak knees, lower back, aggravating health problems. Be careful, train for climbing and see which works best for you. ◆

Recumbent Gear

by Bob Bryant

STUFF YOU NEED

In order to ride a recumbent bike, you should have the following accessories: a helmet, bike gloves, a rearview mirror. Bike shorts (unpadded) and a jersey are optional, though may improve your performance (especially on long rides).

REARVIEW MIRRORS

Having a rearview mirror is very important on a recumbent bicycle. Very few mirrors will adapt to USS bars, so your best bet is probably a eyeglass mirror. The Take-A-Look is the best we've seen. For ASS recumbents, nearly any bar end mirror will work okay My favorite is the Mountain Mirrycle. I've used them for years. I've tried fairing mounts several times, and the mirror vibrates too much. Manufacturers SHOULD supply this item as it is imperative to riding safety and recumbents need them more than uprights.

HELMET

You need a new helmet—no, not your 1970's Bell. No, not an old roller-skate, soccer, baseball, football or motorcycle helmet. You need a real bicycle helmet, preferably a new one. Have your local bike shop help with fit and adjustment.

PEDALS

There are two basic types of pedals for recumbents. Standard platforms and clipless. Most pedals that come with recumbent bicycles are inexpensive platforms. If your bike came with cheap plastic pedals—get rid of them. Enthusiast who ride with groups and clubs on performance rides may want to consider clipless pedals.

Clipless Pedals—Both Angletech and Zach Kaplan suggest Beebops. Kelvin of Angletech says, "They have 20 degrees of float, a large cleat/pedal interface, you can get out inboard or outboard, springless, so easy entry. Lots of good feedback from customers."

Over the years, I have used Time ATACS which I always liked, and Shimano SPDs. There are lots of bargain SPD compatibles, but I have always liked real Shimano SPD's the best, the dual purpose M515 or PDM324 are affordable and durable pedals. For more information on clipless pedals, see our rant elsewhere in this issue.

Finding a pedal with proper float has always been an issue. I suggest that you look into this to satisfy your needs. Good quality shoes can be difficult to find. Angletech has always given me great shoe advice.

Power Grips are MTB platform pedals that have a thick strap that runs diagonal across the pedal. The idea is that you stick your foot in, straighten it and the strap tightens—sort of a faux clipless pedal. This can feel tight on your feet. I recommend using Locktite on the hardware when you are assembling the pedals.

We do not recommend any kind of heel slings, toe clips or any other kind of retention device. I either ride with clipless or without anything. I may consider a half/clip.

Retro pedals—I broke my $200 clipless pedals in a bad crash a few years ago. I chose not to replace them. Since I mostly commute and ride around town (rides <15 miles), I have opted for BMX beartrap platforms with SCOR Kneesavers. Though I take some crap for this, my retro pedal heroes is Steve Delaire of Rotator, who had this to say, "One of the lines I use when people ask about my choice of pedals is, "recumbents are all about comfort and I find bear traps to be the most comfortable for my feet and riding style." When at the Portland races, after one of my wins, someone came over to look at the bike and noticed the pedals and then the shoes, his jaw dropped as he exclaimed "I just got beat by tennis shoes." It always makes me laugh.

SHOES

Kelvin Clark at Angletech has this suggestion, "Shoe wise—it's Sidi. Standard width, Mega (wide), and a womans. Dominator 2 for men, Toscana 2 for womans. The Sidi's are the stiffest, have a roomy toe box, and a very decent heel cup, as well as the ratcheting buckle system at the top versus velcro. These are rocker soles, not flat. Super raves on the comfort."

CLOTHING

Recumbent wear comes in many varieties from several different mind-sets whose groups are fairly vocal about what is acceptable.

Bike shorts—Lycra skin tight shorts and bright skin tight tops with wild colors, logos and brand names stitched on them (clown suits to some). If you have the body for them and like to wear stuff like this, more power to you. Skinny folks can wear the running/rollerblading two panel shorts and get them for a good bargain. The best we've tried are from Boure can can be found in the Calhoun Cycle catalog (RCN advertiser). These are eight panel shorts that fit very nicely. They come in bib and regular shorts. Boure makes a recumbent short. Boure can make these with no pad and no chamois or with a thin liner. Mine are all Lycra with no liners, and I've been riding with them for 5 years.

Sweats—I don't like riding in cheap sweats, though polar fleece works well on cold days, but can be rather bulky in the heavier cuts.

Cool workout pants—I found some great riding wear through Otomix, a company that caters to the marital arts world. They are high thick (3" waste band) wasted with narrow legs. They are a 50/50 polycotton. One of mine even says made-in-the-USA. They are light feeling and work great for recumbent riding. (Otomix 1-888-793-2858 www.otomix. com).

Down-under (guys)—You are not supposed to wear underwear with Lycra. If you can handle this—it feels great. The Lycra will feel great with nothing in between— and will energize you on long rides. For my commutes, I often wear baggie pants, workout pants (see above) or loose fitting shorts with boxer shorts underneath.

Recumbent jerseys—These are rare, but available. My favorite place to buy non-Lycra riding attire is LL Bean. There stuff is all oversized and semi-baggy and extremely high quality (more so than REI, Eddie Bauer, etc). LL Bean stuff is made to be layered.

LIVING WITH YOUR RECUMBENT

Tools—Your local bike shop or mail-order source can set you up with tools. I have a small bicycle tool box with enough tools to completely overhaul my bike. I carry enough tools to handle most roadside problems. I love those the compact multi-tools!

Repair stand—Many manufacturers (Vision, Burley BikeE and others) offer repair stand adapters. Having one will make it easier for you or your mechanic to work on your bike. Some recumbents fit into regular repair stands (triangulated frames with standard frame tubes)

Note: If you don't take this seriously, you may end up with a big scratch in your paint from the bike falling off the stand. A large work table and workout stand (lifts rear wheel off ground) is a good way for you to work on your recumbent in the garage at home.

Workout/training stand: BikeE and Kurt/Kinetic offer small wheel training stands. Full size wheel recumbents will work with other trainers.

Pump—Every rider needs a good floor pump. There are difficult to find. I have a ToPeak Joe Blow that has worked fine for years. It accepts both schraeder and presta with ease (double head). You should also shop for a compact high pressure pump that can easily

and quickly pump your tires up to 100 psi.

MAINTENANCE

Recumbents need maintenance just like all other bikes. Besides the regular stuff (get *Bicycling's* maintenance book). It is more work keeping the chain clean because it is longer (2-3 chains). Idlers and bearings wear out and should be checked. Suspension parts need continuous maintenance (check pressure often to see how often you need to check it). Suspension forks, shocks and swing arm pivots need yearly maintenance.

ACCESSORIES

Fenders—Your best bet for fenders is the manufacturer of your bike, selling dealer, or recumbent specialists. Most are more difficult to install than on upright bikes, and don't work as well. The best fenders we've seen are the hand laid up carbon fiber fenders from Easy Racers, though if you own a RANS, Vision or BikeE, get fenders from them if possible. If you are selecting a bike and frequently ride in the rain, snow or damp weather, be sure to consider only models that readily adapt to oversize tires and can easily accept fenders (even the non-factory type).

Note: Stock fenders are often made to fit factory tire choices. If you opt for fatter tires, the fenders may not work. It is best to check to see if your bike will accept fatter tires and fenders prior to purchase.

Seat bags—The best seat bags come from BikeE, RANS, Angletech and Vision. BikeE straps to the back of the seat; RANS and Angletech cap over the seat top. Angletech's is made in the USA; RANS and Vision are made overseas. Vision's seat bag is smaller than the others though has a slick new clip mounting system that leaves the main mount on the seat and the bag quickly disconnects off the bike. I saw a prototype, and this could be the best mounting system yet, though the bag still isn't big enough and doesn't zip closed (only snap buckles closed). The BikeE bag is made by Jannd. It is the best quality, most durable and seems to be the largest recumbent bag around. In a pinch, we strapped a simple backpack to the back of a BikeE and a Cycle Genius test bike. This should work on many recumbent bicycle models.

Calhoun Cycle also offers a line of European recumbent bags and other custom recumbent accessories. Most any bag can be adapted to recumbent use. Behind the seat is the optimum place. I use a rack top bag, but hate them with a passion. Panniers are even better.

Pannier/racks—Consider load carrying capability and check rack availability and type before you buy a recumbent. Amid-ship mount racks work great on recumbents. Some stock models can be adapted to fit other models.

Fairings—See "Recumbent Performance" elsewhere in this issue.

Computers—Installing computers on recumbents is no fun—especially on 16-inch front wheels. Have your selling dealer or manufacturer make a recommendation and/or do the install.

Trailers—The best quality trailers we have ever seen are made by the Burley Design Coop in Eugene, Oregon. I raised my kids towing them in a DeLite folding trailer. We finally sold it to another family and it is likely still in use today. Burley has a new smaller touring trailer as well. The stock Burley hitch is the best one we've tried, though it requires a rear triangle. There is an optional hitch for cantilevered stay bikes. The Burley Piccolo is the child bicycle trailer (one wheeled bike that tows behind another bike) of choice for recumbent riders.

It has its own rack and is the toughest most durable system (others clamp onto upright bike seat posts). BikeE is the only recumbent manufacturer to offer trailer hitch options for their bike. BikeE Burley trailer hitches and Burley Piccolo (child bicycle trailer) mount are available options. Cambie Cycles in Canada offers a recumbent trailer bike.

Spare Parts/Repair Kit—It is a good idea to develop both an emergency repair kit to carry on your bike, as well as a cache of spare parts that are specific to your bike.

An emergency repair kit might consist of a spoke wrench, chain tool. Some duct tape, a spare tube (one of each size), some hand cleaner, and a spoke of each size, or emergency spoke. If you have a bolt-on axle hub or seat, carry the proper wrenches. You should also carry the common allen-wrench sizes that fit your bike.

Lighting—Zach Kaplan is the best recumbent lightning specialist we know. He recommends Nightsun lights, or he can build you a custom wheel with a Schmidt hub generator. ◆

RCN Classified Ads

Recumbents For Sale

FOR SALE: VISION SABRE R65 with Ultegra components, fast, $2000. **Culty trike**, made in Germany, an excellent commuter $2000. **MicWic Delta** back-to-back tandem, made in England $4,700. Plus Shipping. Tel 616.662.1170, or noebent @hotmail.com (Michigan)

FOR SALE: RANS STRATUS, red med.frame, exc. cond. $850; Easy Racer EZ1, blue, like new, $470 Tel./fax 631-325-3516 or e-mail: bronna@mymailstation.com (NY/68)

FOR SALE: Tour Easy EX, 2000 model, large frame, black, cobra seat, 27-spd mega-range, V-brakes, fenders, rack, super-Zipper, cages, kickstand, 1500 miles, exc. cond.; $1800+ shipping daverudz@hotmail.com or Dave 208-336-0993 (68)

FOR SALE: VISION VR44 ASS, red, 406 front, exc. cond. Extras: 16" fork and wheel, USS conversion bar, fenders, light bar, tire and tubes. Asking $895 plus shipping. Tel. 210-930-6097 (San Antonio, TX/68)

FOR SALE: QUADRACYCLE, 4-wheeled bike, all deluxe, brand new, boxed for shipping, just paid $2400, asking $1700. You pay shipping. Rode it twice, lost interest, also a trailer to haul your bikes. Located South Dakota. Tel. 605-665-3934 (SD/68)

FOR SALE: BIKEE CT. Fully equipped with the following: BikeE cyclometer , BikeE bag, Quick releases all round, Fenders, Kickstand. This bike is like new with less than 2000 miles. Asking $ 450.00 or best offer Bob Aberson Tel. 858-485-0378 (68)

Wedgies For Sale

FOR SALE MIYATA-1000LT-54cm-touring bicycle-Like new-deore group w/racks & computer-complete ready to tour-Paid $950, asking $225; **NISHIKI** women's touring cycle w/racks & computer $200 Tel./fax 631-325-3516 or bronna@mymailstation.com (NY/68)

Publications

Easy Riders Recumbent Club Magazine. Sample copy $5, Connie McAyeal, PO Box 1688, North Plains, OR 97133-1688

Recumbents For Sale

FOR SALE TRIKES: Hase KettWiesel $1895; Hase Lepus $2595; Penninger Traveler $1695; Penninger Voyager $1795; **BIKES**: EZ1 SuperCruiser $395; All used for guided tours. Very low mileage. Like new condition. www.laidbacktours.com or 1-800-786-1274

Tours—Recumbent

New Orleans Ride 'em & Blues Tours
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Parts

FOR SALE: 20" FRONT WHEEL, 406mm Velocity Razor rim, 28 home Dura Ace hub, 15 guage radial, includes Conti GP tire, low miles, $40. **RECUMBENT KIT FOR KREITLER ROLLERS**, extends std rollers to accept wheelbase range of 57.4"-72.6", good condition, $15. Tel. 801-594-3267 or swalters@csw.L-3com.com (67/68)

Wanted

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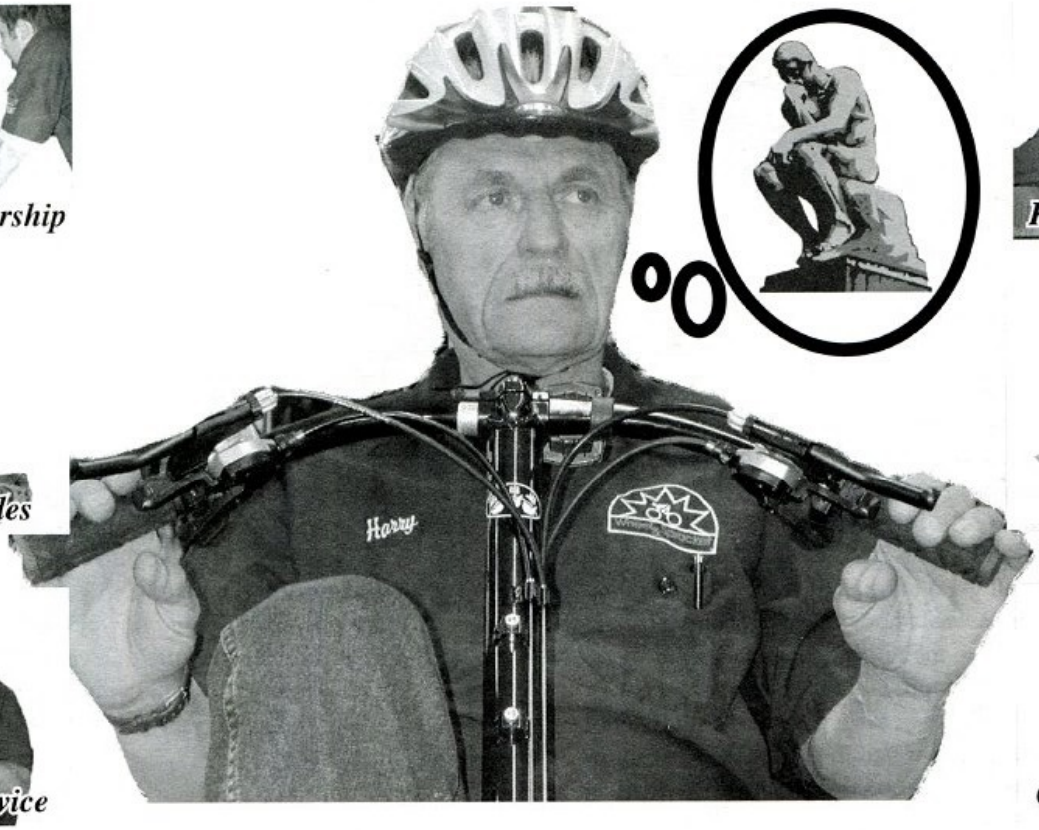

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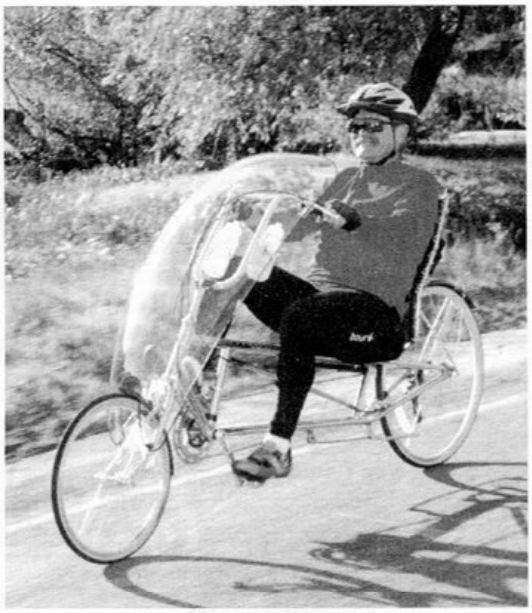
Easy Racers: Our Customers Speak

SUBJECT: How Does That Thing Climb? April 4, 2001

Just a quick update on the Gold Rush Replica that I purchased about two months ago. Great!!! The weather in Cincinnati is just starting to break. I have over 900 miles on my trainer since February, and about 120 miles on the GRR. With the weather breaking the GRR should see about 150 miles a week.

The GRR becomes more of a blast the more I ride it. I did my first climb out of the river valley where our major bike path is located. Everyone warned me that I would be in trouble on a climb. So I was somewhat apprehensive as I started the 1.5 mile climb out of the valley.



Double Century Man, Ron Bobb,

First, I never got out of the middle chainring. I think I could have stayed in the large (53). I held between 13 and 17 mph for most of the climb. I never dropped below 11 mph. I was very impressed. I have climbed this hill hundreds of times on my Trek OCLV and felt far worse at the top of the climb than on the GRR.

As a matter of fact, I felt great on the GRR!!! No back pain; nothing. The ride back down was a hoot. I had a friend with me (about 5 minutes behind me up the hill) as I descended down into the valley. I was hitting 40 mph without moving my legs, and using the brakes into the turns because I was not sure what to expect from the GRR at speed around the turns. My friend had to pedal like a madman and he still couldn't keep up. The GRR felt like a sports car going down the hill. What fun!!! I wish I had started this 30 years ago instead of my mid fifties!!!!

Best regards,
Doug Pendery

SUBJECT: GRR Update
April 25, 2001

This past Saturday I rode with a few friends that have conventional racing bikes (Wedgies; I think you call them). We climbed out of the valley up the Route 48 hill. This climb goes for about 1.5 miles. I pulled my friends up the hill at about 18 miles per hour and crested at over 20 mph. Needless to say they were out of their saddles trying to stay up. I must say I was winded, but so were they. Their comment was, "I guess your recumbent doesn't have a problem going up hills."

In my younger days (about 8 years ago) I would have pushed myself to my limit to go 18 miles per hour up this hill on my Trek OCLV. My point is the GRR is a great recumbent. I enjoy going up hills on it more than my OCLV. I am more relaxed, my back doesn't hurt, and my legs aren't killing me from being out of the saddle trying to lever the OCLV up a hill.

By the way, we had a tail wind on one stretch of the ride. I managed to get up to 36 mph in the flats. Nobody passed me....It was a real hoot!!!

Best regards,
Doug Pendery

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