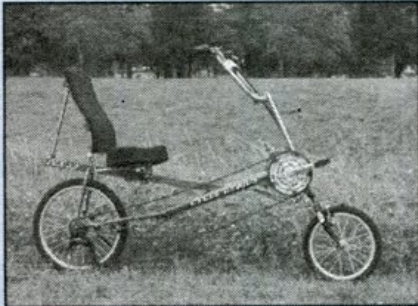


Recumbent Cyclist News

RCN 080

A Publication by and for Recumbent Enthusiasts Since 1990

Jan./Feb. 2004



The bargain priced 2004
Cycle Genius CGX
See page 6



Pippa Garner writes about
Human Powered Utility Vehicles
(recumbent quads)
See page 22



Zach and the BiGHA at Burning Man in the Nevada Desert

RCN ROAD TEST BiGHA



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Be sure to check out
our website at:
www.recumbentcyclistnews.com

By Zach Kaplan

I first learned of the BiGHA in the form of rumors in the summer of 2002 when a large recumbent manufacturer, BikeE, in Corvallis, Oregon, was in the process of going out of business. The rumors involved alleged sightings in Corvallis of a very modern looking medium wheelbase (MWB) recumbent with a fancy extruded aluminum frame. It was said to look somewhat like a BikeE but with larger diameter wheels and a higher level of sophistication.

Within weeks of BikeE's phones and website going dead, www.bigha.com sprung to life. It was a small website with some computer generated images of a relatively tall, relatively high bottom bracket (BB), upright seat, MWB with a full size rear wheel and a mid-drive. The website wasn't promoted in

any major way but people found out about it and started discussing BiGHA on the various internet recumbent discussion groups.

About the same time some recumbent riders who were on the 2002 Cycle Oregon reported seeing a small fleet of prototype BiGHA's. A lively discussion ensued about the meaning of the name BiGHA, why the logo was an elephant wearing a hat, and why so many of the employee names on the BiGHA company phone directory were the names of former BikeE employees/investors. They also wondered about integrated electronics system, if the bike would ever make it to production and how it would be marketed (dealers or direct). For a while no one knew how much it would cost. Various

Continued on page 12

Recumbent Cyclist News

Subscription Information

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

Recumbent Cyclist News is published eight times per year. US subscription rates are:

\$32	1 year, 6 issues*
\$45	1 year first class mail**
\$60	2 years, 12 issues
\$80	3 years, 18 issues*
\$45	Canadian Airmail (US Funds)
\$60	International Airmail

We accept payment via cash, check money order (mailed) or PayPal (see our website).

* 3rd class mail is *NOT* forwarded by the USPS. If you move, there will be an additional charge to resend issues.

** Recommended for those who've had trouble with their mail, move often, or have two seasonal addresses.

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Tel. 360-379-5607 Live & VM (if I'm not out riding)

Schedule

RCN is published six times per year, every other month. The March/April issue should arrive by April 1. If not, contact us.

When to Renew

Please renew 60 days in advance if you can. By the time you read this issue, the next issue and database have gone to the printer.

Your Mailing Label

"EXPIRES W/RCN 076" means that RCN 76 is the last issue of your current subscription.

Address Changes

Don't forget to send us your new address when you intend to move. Please allow 60 days' notice for address changes.

Standard Subscription/Missing Issues

RCN is mailed USPS 3rd class — which the USPS doesn't forward. You are responsible for keeping us aware of your current mailing address. If you miss an issue due to an RCN or USPS error, we'll send a free replacement. If you miss an issue because we don't have an up-to-date address (at mailing time) — the replacement must be ordered and paid for by you. The cost is \$4 or (-1) issue on your sub.

We do offer a first class subscription upgrade.

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BiGHA, BikeE, Vision & RCN

by Bob Bryant

bob@recumbentcyclistnews.com

BiGHA's Recumbent

We'd like to thank Zach Kaplan for offering us his expertise in this issue with his review of the BiGHA *recumbent*. As many of you know, BiGHA has risen from the ashes of the former recumbent giant BikeE. The two bikes actually look similar, but instead of BikeE's affordably priced *recumbents* for everyone, BiGHA offers a \$3,000 high-tech comfort bike that they DO NOT describe as *recumbent*.

"I've been asked if our design is a *recumbent*. I honestly don't know," says BiGHA's John Acres.

The BiGHA is indeed a *recumbent* as most every bicycle and recumbent enthusiast, dealer, manufacturer and media source will describe it as such. If I had one criticism of BiGHA, it's in their use of the "non recumbent" sales pitch. Frankly, it's getting a bit old. Showing a bit more respect certainly couldn't hurt.

BiGHA is rumored to have spent \$5,000,000 developing their *recumbent*. The attributes of the BiGHA design has been widely discussed on the newsgroup alt.rec.bicycles.recumbent since their website went up late Summer 2002.

Who is BiGHA? For the most part, it's John Acres, the former CEO of BikeE. John came to BikeE late in the game. His background is in the gaming industry (Las Vegas). Key former BikeE employees Lee Eckroth, Paul Atwood, Richard Rau and BJ Strass were hired by BiGHA after BikeE's demise. Paul, Richard and BJ have since left the company.

BiGHA and company come with a lot of past history (BikeE baggage). The company is somewhat controversial and there are still a lot of hard feelings to do with BikeE's demise.

BiGHA is attempting to become a premium brand. Many industry insiders would describe the bike as a bit on the pricey side in contrast to its peers. The similar HP Velo Spirit sells for \$1,700. The Cannondale sells for \$2,000-\$2,200. Both have front and rear suspension, are lighter in weight and have 16" front wheels.

Despite peer comparisons and the BikeE lineage issue, the BiGHA seems to be a fine quality bike. It's built of decent materials and is pleasant to ride. I enjoyed the turn-key aspect of the integrated systems, and the ease of assembly. There is room for improvement as our two test bikes both had wheel problems.

Our road test experience with BiGHA was excellent. This new company went out of their way to provide us with two test bikes, and either corrected or offered to correct any problems we had in a most gracious way. While it won't be an easy road, we wish them luck marketing their new premium recumbent. ♦

Changes At RCN

Effective immediately, RCN will be moving back to our previous six issue per year schedule. This is partly due to the downturn in the bicycle business, but also because it was difficult for our tiny staff to handle the extra issues (we're still trying to catch up). Our advertisers didn't seem very excited about the additional issues and ad insertions either. Had we tried this five years ago in the days before freebie tandem and recumbent mags, Internet zines, we may have been able to handle it.

The magazine business is an odd one. In the mainstream world, circulation costs are offset by the selling of full page glossy advertisements. Have you ever wondered why SUV makers hock their wares in bike magazines? (No SUV makers are knocking on RCN's door at this time.) The micropublishing world is a bit backward. We don't get to use cheap periodical 2nd class mail (and have to use 3rd class bulk mail which isn't forwarded if you move; some advertisers cut down ad sizes when they are doing well, and increase them when things are slow; and we can seemingly never raise our prices. Back in 2000, a subscription to RCN was \$40; in 2002 it was \$35; and now it's \$32. Each year we reconsider whether we should *lower* our sub rate or not. In contrast, my first recumbent cost me \$1,000 (1987). The same bike sells for over \$2,000 today. Also, we're catering to small businesses. Our ad rates haven't gone up much. For 2004 we must raise ad rates, but we're going back to six insertions per year, which lowers the advertisers expenditures (along with our gross revenues).

So, you might wonder, how do we stay afloat? I guess it's due to some good luck, loyal readers, and that you like what we do. Still, I cross my fingers that I won't have to go back to working nights or selling bikes. Port Townsend isn't exactly a hub of economic activity, so I'm committed to RCN for the long haul. Our other company, Millennium Cycles, was perhaps the largest recumbent dealer in the USA back in '91-'93 (there weren't many recumbent dealers back then). We closed Millennium in favor of publishing RCN.

The good news is that we had a record profit for 2002 due to the refinement of our methods. The bad news is that this is our second year in a row of reduced gross revenues. Our website has done exactly *zero* for new business — and has possibly even kept people from subscribing (too much free content). Before you write complaining of our whining editorial, please keep in mind that I haven't written anything like this in a long time.

Recumbent News



26/20 Ti Basso Joines Bacchetta Lineup

Bacchetta has just introduced the AERO-Basso (Basso means lower). This new design is Bacchetta's answer for folks that want the ultimate recumbent experience that the AERO offers but don't quite fit its' dual 650c wheel format. The Basso's 26x20 wheel format has been optimized for riders 5' to 5'8" and was designed by Rich Pinto and John Schlitter.

Like the Aero, the Basso's frame is hand made in the USA by one of the world's most experienced titanium fabricators, Ti Sports, in

Kennewick, WA. Basso specs include a custom 20" Carbon Airfoil fork, American Classic bottom bracket, FSA Carbon Pro cranks, Shimano Ultegra front and rear derailleurs, Velocity Thracian wheels and an M5 carbon-fiber seat. The lightweight Basso offers cyclists great performance combined with superb handling and comfort. The stock bike weighs in at just under 22 lbs and will retail for around \$3800. www.bacchettabikes.com.

Source: Bacchetta



AeroRider Enters Production

The very efficient Dutch hybrid pedal/electric has just gone into production with the first 50 units soon to be delivered in Holland and Germany. The AeroRider has a fiberglass and carbon body. Steering is by joystick. The top speed is said to be 45 kilometers per hour.

For more info, visit: www.aerorider.com

... Editorial License Continued

Independent media voices are getting more and more rare these days. Having a publication that you can archive, carry into the bathroom and read again and again is very rare. For a small magazine like ours to have been around for 14 years is almost unheard of.

If you like our voice, please consider buying a gift subscription, library subscription (ask them first), a multiple copy subscription or upgrade to our first class mail subscription (mailed out special in an envelope via USPS first class mail from the printer in New York). Email us for a subscription upgrade quote.

Vision Update

Vision didn't display product at the Last Vegas Interbike trade show in October 2003. We were told that they'd be there taking orders, but apparently, this did not happen. Several long time Vision employees have left the company: Ricky Comar, Jim Sternberg, Clyde Jenkins, Jeff Ward and probably others. We wish them all well.

Lets hope Vision can pull things together and come back strong.

2004 Season Preview

Look for our 2004 Season Preview/Interbike Report in the upcoming RCN 081. ♦

Scooter Rider: Brother BJ

Many long time RCN readers might remember BJ Strass. He owned Introspect Cycle in Sacramento, California, managed Atlantic Bicycles in Florida, worked for BikeE in Corvallis, and then worked for BiGHA for a time. BJ has relocated back to Florida, and now writes about his passion in an RCN-like micro-mag called Scooter Rider. If you're into scooters, check out: www.scooterridermag.com.

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RCN Calendar

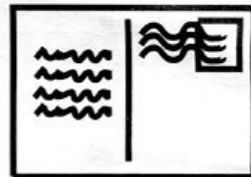
WANTED: 2004 Recumbent events dates, times and ride descriptions.

Hostel Shoppe Recumbent Rally
July 30, 31 and August 1 2004
Stevens Point, WI
Contact:

Bentrideronline Rally
August 2004
Upstate NY
Contact: www.bentrideronline.com

Letters To RCN

Write RCN . . . Write Soon . . . Write Often . . .
bob@recumbentcyclistnews.com



Rotor Cranks

I wanted to share some information about a new product that I have recently started using that seems to be extremely effective, it's the Rotor System articulating crank. They claim:

- Healthy knees
- Easier climbing
- Eliminate the dead spots
- Reduces Lactic acid build up
- Constant power to drive wheel
- Faster cardio vascular recovery
- Improves personal best performance

I received my 26/20 T-Bone from Reynolds Weld Labs: (www.reynoldsweldlabs.com) last April. It's a great bike, fast and low. George Reynolds recommended that I first try the Rotor Cranks on my bike as he'd been using them for a while. He said they had helped him climb as well as, or better than his diamond frame (DF) buddies. Since Rotor Systems offers a 30 day money-back guarantee, I thought I'd give them a try. I removed my Dura ace triple and installed the Rotor System (www.rotorbike.com).

I've ridden just under 100 miles and found that I accelerate better, have a higher cruising and top speed, ride longer and I can now climb the Intra Coastal bridges keeping up with my DF buddies. I have no financial ties to this company and am doing this review to spread the good word about Rotor Cranks.

Marc Webb

Editor Comments — Sadly, Marc Webb was hit and killed while riding his recumbent in late November.

High Performance Wheels

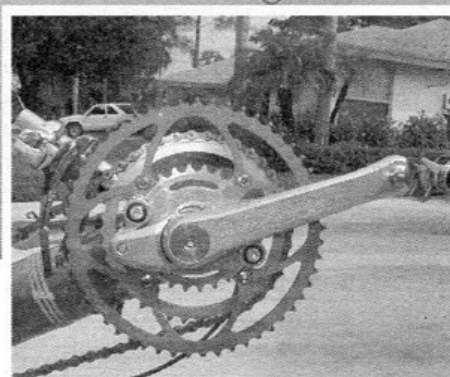
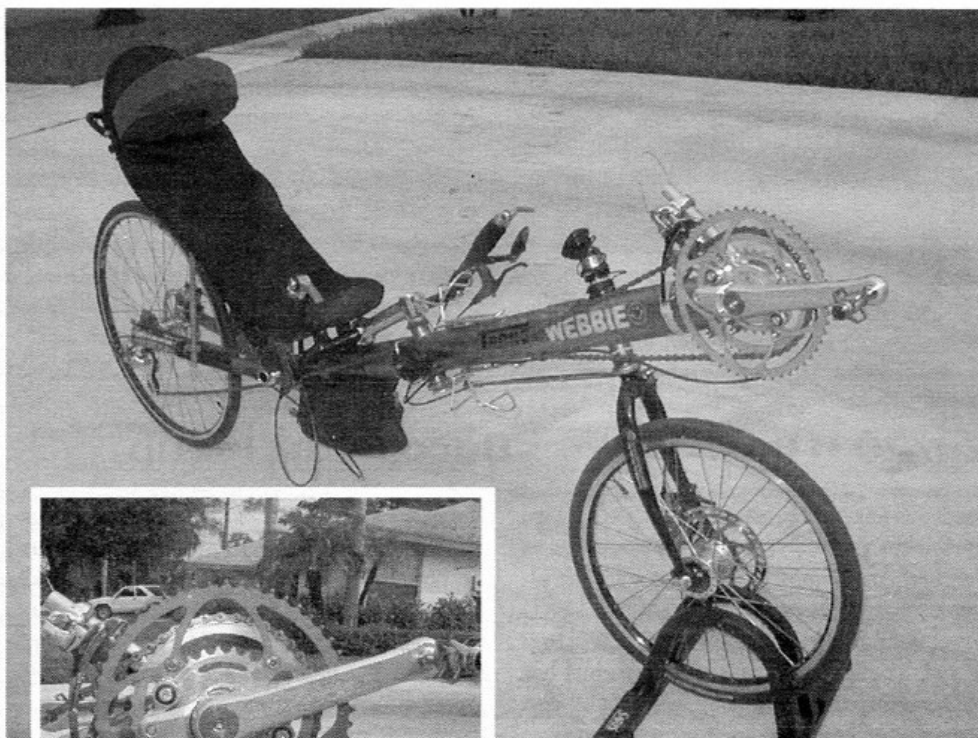
I'm interested in some wheels I saw advertised recently in your magazine — I believe they were Aerosmith HED carbon wheels. Is my data correct? Do they have a web site?

Jack H.

Editor Comments — There are two brands: HED carbon wheels (www.hedcycling.com) and Aerospoke wheels (www.aerospoke.com). You might want to take a look at the Velocity Spartacus or Thracian (www.velocityusa.com)

Tour Easy Accidents

I read the letters in RCN 077 and 078. These two letters got me thinking. Garry Longaker's tragic fall made me ache considering all the pain he must have suffered. I hope he com-



Marc Webb's Reynolds T-Bone with Rotor cranks

pletes rehabilitation soon and is eager to ride. The other letter from Larry Ripp made me think about falls again.

I've ridden a Tour Easy for nearly 3,000 miles, and now a TiRush with a body sock for almost 2,000 miles just this year. Much of the cycling on the TiRush has been in the hills and mountains of Northwest Georgia. I have discovered that wheels and tires have a lot to do with the stability of LWB bikes; perhaps CLWB and SWB too, but LWB is my experience. And there's not much a rider can do if riding into loose gravel from pavement if he's aware of what is happening. Turning in loose

gravel at any speed is exciting enough to keep me from doing it ever again.

Have I fallen? Yes. With loose gravel on a paved street, my bike canted over to the right at 27 mph while going around a corner way too fast. That was the first time I got road rash. Coming down mountain switch backs, coming into the first switch back at 64 mph, using my brakes hard, caused the front rim to over-heat and blow the front tire, which set me down at 40 mph on my right side. I slid about 30 feet and gained more rash. It took a long time to get home.

After those learning experiences, I put



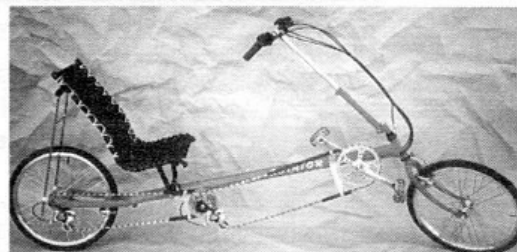
Don't Forget Your Rotator

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48-speeds · new dual 700c

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Visit our website at: www.rotatorrecumbent.com

Aerospoke wheels on the bike. I put Schwabe Stelvio tires on the wheels. I also installed an Avid mechanical disc brake on the rear wheel. The TiRush is a high-performance bike as I see it, so this is my set up to keep my 63-year-old carcass on the bike. So far that works.

— Recently I went speeding at 30 mph along a very rough section of road, and that produced a flat tire, but the stability gained by the wheels as well as about 5,000 miles of LWB Easy Racer bike riding kept me upright and unscathed. And I knew I was taking a chance on that road, which I could have avoided. Also, if I wanted to ride on that road I could have put a “fat” tires on the bike; something with lower pressure than the Stelvios and more rubber on the road.

We ’bent heads, as soon as we get a bit of experience, tend to speed along or to even move slowly over loose-gravel areas. We should consider the tires and wheels we’ll use to keep the bikes going safely. That adds cost, but if we’re going to ride HPVs, then it’s worth it to be safe and keep the fun and beauty foremost.

Richard Stanford

Editor Comments — *Easy Racers LWB have excellent weight distribution (65% rear/35% front) for a LWB. They come in multiple frame sizes. Results of a Scientific study would be difficult as riders come in all shapes and sizes. Harry Wozniak from Wheel & Sprocket brought to our attention that we haven’t discussed tire choice and correct tire air pressure. The smaller and skinnier the tire and the more air in it, the smaller the contact patch.*

Tour Easy Accidents

I read both Rick Honor’s letter in RCN 077 and Larry Ripp’s in 078 and I have to agree with Larry except that I don’t feel that the problem is steering geometry. I’m 6’4” and weigh 205 lb. and ride with the seat all the way back. This makes the front end very light. I’ve gone down twice because of wet spots in the road and now I’m super careful any time I make a turn of any sort. Slicks for tires don’t help the situation, either. I love my Tour Easy but any water, sand or gravel under the front wheel in a turn can be a disaster. I’m embarrassed that it took me two spills to get the message. You’d think that this would be a problem with any LWB bent with the rider seated ‘way aft. Ride safely and carefully, people.

George Drake
bentster@swbell.net

Goldrush Geometry Wrong?

Controversial? That statement is so controversial I suspect Bob planted your letter just to watch all the Gold Rush loyalists jump out of the bushes!

I confess to being a loyalist. I’ve been on a TiRush for 5.5 years and 20,000+ miles I’ve pushed it up the Rockies at 5 mph and back

down the other side at 58 mph, not always on dry, clean roads, and through a variety of Midwest rain and snowstorms. I’ve always wondered about the stability of that little front wheel, and, no, I don’t try gravely turns at 20 mph. With judgment, road-awareness, and luck, I’ve never skidded or fallen. In fact, I often liken the feel of the Gold Rush at speed to a rocket sled on rails: there’s no shimmy, no shake and the faster you go, the harder it sticks to true if you don’t panic and oversteer. The only scares I’ve had were deep parallel pavement cracks that I didn’t see coming, and was abot to save it both times.

I did have a frustrating day on the Michelson trail in South Dakota. It was a gorgeous 80 miles, but it’s all gravel, with lots of loose spots, and keeping the tiller front wheel from sliding out took a lot of concentration and some speed reduction. Although I ride short distances on gravel when I have to, I don’t consider the Gold Rush a loose gravel surfaces bike. It does better, however, than any upright roadie I’ve ever taken on gravel.

Mark Taylor

Editor Comments — *I’ve ridden Easy Racer bikes on rail trails, single track and even jeep trails. It can be a fine off-road recumbent when properly sized and outfitted with the right tires for the job. The only better design for off-road riding is the Lightfoot Ranger.*

Frequent Urination

I read the letter about frequent urination on a Phantom II. It has NOTHING to do with the bike. The author should have consulted a urologist, not you. I just road the MS 150 in Georgia and had no trouble.

Bob Rose

Frequent Urination II

While nothing is ever certain when it comes to medicine I suspect that problems with frequent urination may be caused by a problem

with the pudendal nerve.

As I’m not a physician and somewhat hesitant to attempt a description of why the recumbent riding position could be causing this problem. I’ll say, however, that it’s more than likely related to an overly tight piriformis muscle being aggravated by the laid back riding position.

Interestingly enough, it would appear that problems with the piriformis muscle may also be the root cause of recumbent butt.

For folks who are suffering from either one of these unpleasant problems I would highly recommend the book, “The Stark Reality of Stretching” by Dr. Steven Stark. This excellent book details a number of very effective stretches designed to prevent and or cure exercise induced injuries. I have found the book to be of great value when it comes to conditioning my body for the stresses involved in cycling.

Winston Shaw

Lightning

I received my first copy of the RCN. It’s very nice and always informative. I was impressed by the one letter about the P-38, since I have a Thunderbolt A-10, and had similar problems with Lightning and their seemingly indifference. I did return the chain for a whopping \$15 refund. I replaced the chain with a Shimano HG, which is much better and have since put on Stelvios, front and rear. I also found a dealer who stopped carrying Lightnings because of quality control problems. They apparently received the bike with some poor adjustments. My local bike shop corrected all the problems. I found an article about upgrades and I think I want to do some more upgrades to the bike. It seems to be working fine for me, for my first ’bent.

Irwin H. Koransky

... Continued on page 30

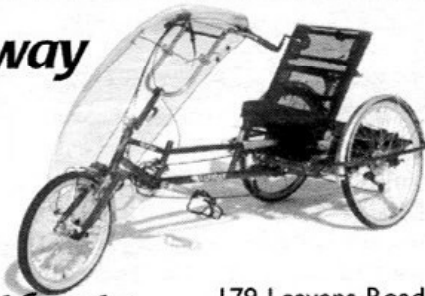
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Send Letters to the Editor of RCN

If you have something to say, a differing viewpoint or experience—we want to hear from you! **Please limit letters to 300 words.** RCN reserves the right to edit submissions for clarity, content, and space limitations. Please send to bob@recumbentcyclistnews.com or RCN, PO Box 2048, Port Townsend, WA 98368

Hot Bike Of the Month

The Cycle Genius CGX

"The CGX offers the perfect balance of performance and economy. With it's 20"/16" wheel combination and the geometry of it's high end cousins, the CGX is pure fun!"

— Cycle Genius

Cycle Genius is quickly earning respect of new recumbent enthusiasts and dealers alike from coast to coast with their affordable line of entry level performance recumbents.

The CGX is unique in that it's more user-friendly than a typical medium wheelbase (MWB) has the size of a compact long wheelbase (CLWB) and rides much like short wheelbase (SWB).

The CGX offers a HiTen steel frame which has the same geometry as the up line STX and ALX²⁰, but has a user-friendly 16-inch front wheel. Another notable difference is the steel "chopper" style bars instead of the aluminum T-bar on the STX and ALX²⁰. Best of all, it's a great buy at \$450 (\$175 less than an STX.)

Comfort

While many riders feel that a full mesh seat is the holy grail for recumbent comfort, the new breed of entry level enthusiast apparently didn't seem to feel that way. Cycle Genius (CG) took a fair amount of criticism for their mattress-style sprung seat base. For 2004, a new foam seat base is available on the CGX and STX and will improve rideability for most. The new foam seat base makes the seat feel lower to the ground and is certainly the best choice for new riders. The seat adjusts six different ways, but has a relatively low seat back (a negative for taller riders).

User-friendliness — The higher BB MWB design takes more time to get accustomed to than the low BB recumbents. The main difference is in response time in moving your feet from the ground to the pedals. The CGX is the most user-friendly of the Cycle Genius bikes, but it isn't quite as easy to ride as an EZ-1.

Ride/Handling

Stability — The CGX is a casual recreational bike. It's stable, tracks well, and is maneuverable. The lack of a boom/heel interference with the front wheel is a confidence builder to new riders. The downside is that the bike can feel tail heavy and light



The 2004 Cycle Genius CGX — a buy at \$450!

For

1. Great value
2. Similar parts to the STX
3. 6-way adjustable seat
4. Fun and easy to ride
5. Chopper bars

Against

1. Heavy bike, seat, bar/stem
2. High BB not as user-friendly
3. Feels small for 6' rider
4. Seat back is relatively low
5. Plastic pedals

Why Buy This Bike

SWB feel with no heel interference and a great value — \$450

Contact

Cycle Genius
Tel. 866-901-BIKE

Web: www.cyclegenius.com

Specifications

Model: Cycle Genius CGX
Type: CLWB/MWB OSS
Size: One size fits most
Wheelbase: 52.25-inches
Seat height: 24.5-inches
Pedal height: 21.25-inches
Weight: 40.5 pounds
Frame: HiTen Steel
Price: \$449

Seat

Back: Dri-Cool mesh
Base: Foam covered base shell

Components

Crank: Alloy 30/42/52 with guard
Bottom bracket: Neco
Headset — NA
Derailleur(s): SRAM 5.0 (rr)/3.0(ft)
Shifters: SRAM 3.0 24-speed
Cassette — SRAM 11-28 8-spd.
Chain — KMC
Gear inch range: 20-90
Pedals: Alloy
Wheels: 406 mm 20", alloy QR
Tires: Kenda Kontakt 1.75 65 psi
Brakes: Alloy V-brakes
Colors: Pacific Blue (turquoise)

in the front end, especially for taller riders.

Performance — The CGX isn't the fastest model in the Cycle Genius line. However, its a much better buy than the STX (by \$175)!

Systems

Frame/fork — The frame is nicely built in Taiwan of HiTen steel. The bikes seem more refined than the similarly priced Sun models, although coming out of the same factory. The frame has a mix of square and round tubes. The quick release (QR) seat slides along the stop square tube for easy adjustment. The STX has a HiTen/CroMo frame mix and the ALX²⁰ has an aluminum frame.

Steering — The high rise stem riser (540 mm) can be faced forward or backward and has quite a bit of vertical rise as well. You'll notice in the picture that the bars are fairly tall. While this bar/stem combo is heavier, the riding position is more adjustable, and many will prefer the "chopper style" of these bars.

Drivetrain — All of the Cycle Genius models have the best chain management a recumbent can hope to have — a short chain and no idler. The downside is the relatively low gearing. Higher gears are available on the ALX²⁰.

Braking — The generic V-brakes stop fine.

Wheels and Tires — The Kontakt tires are comfy and perfectly suited for this bike. While slower, these low pressure 65 psi tires make for a comfy ride. This frame is quite firm and stiff riding, so a lower psi tire isn't a bad idea.

Integration — The bikes feel more refined than they appear. I'm not sure what it is, perhaps the mix of round/square tube that buyers think lesser of in our business. It's no big deal given the value of the CG bikes.

Verdict

The CG line is looking good. They are a friendly company who is earning respect in the recumbent business. In a recent visit to their website, I was amazed at just how many dealers they now have. We love affordable recumbents, especially those under \$500.

While some enthusiasts may raise an eyebrow at the no-name components, keep in mind that we've seen other more expensive recumbents with similar setups. If you like the CG design, and want some name-brand stuff, opt for the bargain ALX²⁰ (for a full review, see the July 2003 RCN 076).

The only other minor criticism is the center of gravity. Taller riders will definitely notice a rear wheel weight bias, though we're accustomed to this on most entry level CLWB 'bents. The concept is to keep the bike short enough so it can be stored and transported more easily.

My last criticism is weight. The CG bikes are heavy. Of course, they are dramatically less expensive than many of the other 40 pounders we've reviewed lately, and one potential 50 pounder in this issue that sells for 5x as much.

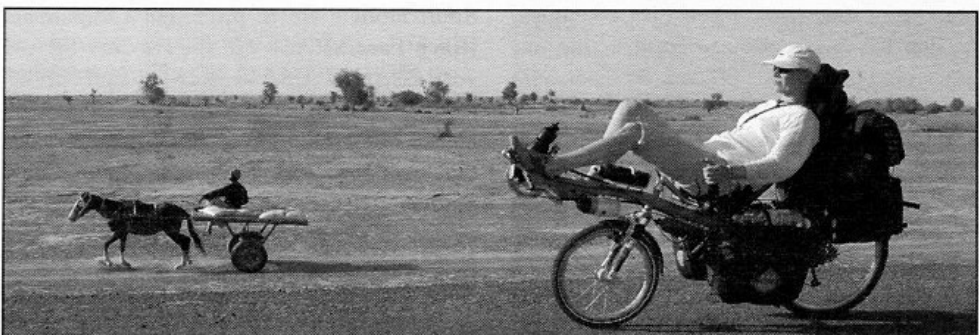


Amy Bryant (5'5") riding the CGX

We like both the STX (which is improved for 2004 with the CGX seat and a 20-inch front wheel), and the ALX²⁰. The CGX has the smaller front wheel, slightly lower BB, and chopper bars. The bike is a friendly choice for the first time recumbent buyer. It's a fun bike to have around and we were sad to see it go. Cycle Genius offers a unique design: a MWB that feels like a SWB without a boom. The bike rides well and is a terrific value. Our hat is off to the folks at Cycle Genius for their line of affordable enthusiast recumbents. ♦



CGX (photo by Cycle Genius)



Maya van Leemput takes her Street Machine Gt for a spin in the African desert. Read Agence Future's story at www.hpvelotechnik.com.

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RCN ROAD TEST

The RANS Screamer Sport Tandem

By **Dave and Lisa Krack**
davebikes@netgenie.net

Tandem. The word implies a serious commitment between two people. The right bike can convert a non-cycling spouse or friend into a riding partner, or alienate them from cycling forever so choose wisely.

Our quest for a tandem began in March 2003. We started with an open mind and list of several questions. The first question was, should we buy or build? I have a tendency to tinker and have already built several recumbents for personal enjoyment and weird looks from motorists. When Lisa convinced me that the aggravation in constructing our bike would be a source of incredible personal and marital stress, we decided to buy. We then needed to decide which type of tandem, conventional or recumbent? The conventional bike appealed to my cheap side. We found a used Burley within an hour of our house for only \$1,000. A recumbent would be a minimum of \$1,900 for a Sun EZ Tandem. Lisa then pointed out that cheap wouldn't be comfortable. It was time to test ride.

I've been riding various recumbents for about six years compared to Lisa's single co-erced test ride of an EZ-1. We began testing a KHS drop bar road bike tandem at Rapp's Bicycle Center here in Butler, Pennsylvania. It took us many laps around the local high school parking lot to feel confident and stable enough on the bike to avoid hitting parked and moving cars, but we were uncomfortable. Next, we rode the RANS Screamer. That test ride just kept going and going. I was apprehensive about Lisa's response to the recumbent stoker position, but she loved it! The comfort and stability we experienced were unmatched by the

upright tandems (KHS and Burley) we rode. Within 15 minutes of riding the Screamer, Lisa could take her jacket off and fix her helmet without affecting the bike's stability. The Screamer it was. The next question, should we buy new or used?

I've dreamt of a tandem for quite some time, but had been avoiding the Screamer due to its cost. The Screamer is \$4,299. For 2003 RANS unveiled the Screamer Sport for \$3,395. The difference between the standard Screamer and Sport models are in price and components (Race Face/SRAM 9.0 vs. Truvativ/SRAM 7.0), assembly (USA vs. Taiwan), and options (captain's boom lengths and color choice vs. galaxy blue). Our dealer offered us his demo Screamer for a reasonable price, but the new Screamer Sport was just too appealing. We placed the order and we waited impatiently for our new bike.

Systems

Frame and Fork — The Screamer Sport frame and 1-1/8" threadless fork are constructed of TIG welded 4130 CroMo steel. Steel is a wonderful choice for bicycles, and tandems are no exception. It's easy to work with, has a long life and usually doesn't usually fail catastrophically. The frame utilizes a 2" main tube, which provides the mounting for both seats and the captain's bottom bracket (BB). The welds look good. They aren't extremely pretty, but pretty welds don't necessarily equal strong welds.

Steering — The over-seat steering (OSS), the fine RANS Top-Loader Flip-It™ Bar System, conveniently adjusts for height and reach.

The top loader function allows the handlebars to be changed quite easily, if so desired. I did notice that the adjusting bolt for the tilt squeaked and quickly wore a groove into the Flip-It aluminum stem. A small piece of recycled inner tube stopped the squeaking and halted the groove. A Ritchey Logic threadless headset keeps the steering smooth.

Weight — RANS claims a complete bike weight of 45 lbs. I found it weighed 54 lbs. Of course, I weighed ours with fenders, two bottle cages, a cycling computer, a rear flasher light, and an empty seat bag. We found that the bike's weight seems much less significant when 320+ lbs. of human powered motor is figured in.

Drivetrain

Components — The Screamer Sport components emphasize value. The specs include SRAM 7.0 brakes, brake levers, rear derailleur, and twist grip shifters. The levers and shifters feel like the plastic they are made of, but work fine. The front derailleur is a Shimano 105. This probably explains why the front shifter indicator number doesn't always match the actual front chainring selection.

The rear 9-speed system works well, even though I still prefer 8 or 7 for long term durability. The SRAM 1:1 actuating system makes shifting precise, even with the long tandem cables. The Truvativ Elita Tandem crank sports 30/40/52 chainrings and a nice polished finish. Coupled with the stock 11-32 cassette the gear inch range is 25-123. A tandem really needs the wide gear inch range; you'll find that all of it will be used. I would like the low to be a bit lower, but haven't yet exchanged the 30-tooth ring for a 26. The bottom brackets are sealed Truvativ Isis.

Chain Management — The KMC Z9000 chain is sent through a series of four idlers in the Sport Drivetrain. The captain's cranks use two idlers in the timing chain tensioning system unique to RANS. The tensioner works fairly well, but is not as refined as the eccentric bottom brackets (EBB) in use by high quality conventional tandems.

Adjusting the timing chain requires removing a bolt, adjusting a threaded rod, and reinstalling the bolt. The best results were achieved when all tension was removed by pulling the power side of the chain off its idler. If the tension isn't ideal, you must repeat the process. The EBB on my single speed mountain bike is far simpler and less frustrating to use. The EBB system doesn't require chain removal and only requires one bolt to be loosened. Another Screamer owner found this to be quite frustrating and made his own tensioning system.

The rest of the drivetrain, from the stoker's cranks to the rear wheel, employs two more idlers. One is for the power side and one is for the return side. Power side idlers compromise efficiency. The Sport drivetrain is fairly effi-



The Screamer Sport is a long bike

cient, but could be improved. If the power side idler was moved closer to the frame, or the chain stays were moved closer to the ground, this would be better.

When we originally received the bike the shifting was noisy and horrible. A quick inspection revealed that the idler bracket had been improperly installed causing a terrible chainline. When I moved the bracket from the outside of the mount to the inside, the drivetrain and shifting were quieted significantly. The whole drivetrain still exhibits some noise under heavy load, but some compromises are necessary in dealing with long recumbent tandem drivetrains.

Braking — The Sport's 7.0 linear pull V-brake levers and brakes work adequately. Upon arrival, both the front and rear brakes were somewhat spongy. Only so much can be done for the rear since the cable is *really* long. By shortening the front brake cable's housing several inches its feel was improved.

One of the nice features of any quality tandem is the addition of the Arai drag brake. The brake is designed to slow the bike, not stop it. It helps on long downhills when speed gets excessive. On the Sport the stoker operates the drag brake with a Shimano bar-con shifter. Installing the cable on the quick detach bracket for the brake proved to be quite difficult due to cable slippage.

A great move on RANS' part was the addition of a rear disc brake tab. Using the tab means losing the drag brake. However, disc brakes allow other sizes of wheels to be used. The Sport frame has lots of clearance for fenders and/or bigger tires in the rear.

Wheels and Tires — RANS specs quality 48 spoke (559 mm) rear and 36 spoke (406 mm) front wheels. Both front (Deore XT) and rear Shimano hubs are laced to Sun Rhyno-Lite rims with DT 2.0 mm stainless steel spokes. The wheels have needed slight truing, but they should last quite a long time. Though not the lightest wheels, they are quite a durable choice. Remember that the whole tandem unit can top 400 lbs.



Dual idlers

People either love their Primo Comets — or they don't. While they are a good value, performance tire, they're not the most durable tires. The Screamer Sport comes with a 1.5 rear 1.75 front Comets, which might not be a durable enough tire for a tandem. I've had problems with the 406 mm Comets in the past. When these tires wear out or fail, I'll replace them with another brand.

Comfort

Seats — RANS makes some of the most comfortable seats in the bicycling world. The Sport is no exception. Mesh back with a foam bottom is their proven formula. I have significant personal experience with several generations of RANS seats. The first was on a '94 or '95 Rocket with a fiberglass base and tall mesh back. It needed a new cushion, but it was comfy. The other is a plastic based one-size back from '99 or '00 on a home-built long wheelbase bike. This cover is slippery when riding in spandex. The base cover and mesh back tears easily, and the foam is too thick and squishy.

RANS has improved their plastic based seats significantly. The base covers are less slippery, the base foam feels firmer, and the seat back has Kevlar reinforced sides. The only small problem I had was that Velcro attached itself to the captain's base, snagging the fabric. Over-

INFO AT A GLANCE

Specifications

Model — RANS Screamer Sport
 Type — Tandem
 Steering — OSS
 Wheelbase — 65" or 70" (XL)
 Wheel size (front) — 406 mm 20"
 Wheel size (rear) — 559 mm 26"
 Seat height — 21"
 Bottom bracket height — 25.5"
 Weight — 33.5 pounds (RCN weighed)

Frame — CroMo TIG
 Handlebar — RANS Top Loader
 Seat back — Aluminum/nylon mesh
 Seat base — Plastic base/foam
 Seat recline angle — Adjustable

Components

Crank — Truvativ Elita 30/42/52
 Bottom bracket — Truvativ Isis
 Headset — FSA 865 N
 Derailleur (rear) — SRAM 7.0
 Derailleur (front) — Shimano 105
 Shifters — SRAM 7.0 (twist)
 Gears — 27-speed
 Cassette — SRAM 7.0 11-32 9-spd.
 Chain — KMC Z9000
 Gear inch range — 23-118
 Pedals — MKS platform
 Rims — Alex DA 16 black anodized
 Tires (front) — Primo Comet 1.75 100 psi
 Tire (rear) — Primo Comet 1.5 100 psi
 Hubs — Shimano Deore 36°
 Brakes — SRAM 7.0
 Brake Levers — SRAM 7.0

Incidentals

Price — \$3399
 Colors — Galaxy red (2004)
 Accessories included — Pump peg

Pro

- Great value
- A Versatile tandem
- Refined geometry — stable at all speeds
- Screamers hold their value well
- Become an instant celebrity (see below)

Con

- Rad Loc clamp need refinement (slippage)
- Taiwan assembly needs refinement
- Expensive
- Won't fit all teams
- Limited options
- Expect to answer lots of questions as you'll become an instant celebrity

Contact

RANS
 Web: www.rans.com
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all, these are the best seats RANS has offered in a long time.

I've experienced mild recumbent butt with all three generations of RANS seats sampled. The first generation was corrected by the newer foam ordered from RANS in '98. The second seat's pain was sporadic and seemed to go away after more time on the bike. The problem was solved on the Sport by sliding the base slightly forward and reclining the back to move into a different position. Lisa hasn't had any problem with the seats, and likes to use the captain's seat pocket as a secret stash.

Ergonomics — The Screamer and Screamer Sport are laid out in a short wheelbase (SWB) captain, long wheelbase (LWB) stoker configuration. The captain's compartment has a 25" seat height and a 25" BB height. The stoker's quarters measure 25" (23" according to the RANS spec sheet) and 12" respectively. The captain's cranks are 175 mm and the stokers are 170 mm. Our bike shipped with a mismatched set of stoker's cranks. The timing chain side was 175 mm. I noticed this when tightening the stoker crank bolts and installing Power Grips. That explained why Lisa felt lopsided while riding and couldn't keep both feet on the pedals at times. RANS quickly sent out the proper replacement crank.

User Friendliness — While the Screamer and Screamer Sport are quite user friendly, they're perhaps not as much so as a lower BB LWB tandem. It's helpful to have an experienced recumbent captain in any road test. We adapted to the bike in about 10 minutes.

Ride and Handling

Tandems can be tricky to control. Conventional bikes allow for both parties to shift their weight, which requires upper body strength to remain in a straight line. Recumbent tandems only allow for one seated position. This inherently makes them easier to control once the recumbent position is figured out.

Stability — When used solo, the Sport initially feels slightly twitchy and slow at the same time. Being slightly twitchy is due to the proximity of the captain's seat to the front wheel, being slow is due to the position of the rear wheel. Once this handling hurdle is cleared the bike is stable at all speeds (Lisa doesn't like testing above 40 mph though).

Starting off on any tandem requires communication, and the recumbent position may be slightly less intuitive for first timers. The only time our stability was odd was when I had adjusted the timing chain and forgot to put the cranks in sync. Lisa couldn't figure out how, or why, I kept launching with my leg in the middle of the power stroke.

Maneuverability — The odds of any tandem winning a bike rodeo are slim. U-turns require two lanes and significant communication. Long bikes take more space to turn around. Within tandem parameters, the Sport

performs well. Potholes are easily avoided, and sharp turns can be done. Working as a team is quite important.

Performance — Tandems are slow going up and fast going down hills. A higher top gear is always welcomed. We are several mph faster than we would be riding individual bikes together, but several mph slower than I am on a single SWB. In our hilly region we average 12-14 mph. With two strong riders the bike has high performance potential. The only major performance improvement might be to replace the front 20" wheel with a 26" wheel, but handling and balancing at stops would be compromised. The frame is stiff laterally and compliant vertically. It feels laterally stiffer than the upright tandems we tried. The RANS down tube sticker sports a well chosen logo, a train.

Owning — The Sport allows two people to enjoy time together. Conversing is easy due to the close proximity of the seats. The Screamer and Screamer Sport are possibly the best performance recumbent tandems currently commercially available. Light or credit card touring with the Sport is a definite possibility. The bike works well for charity rides and makes its riders instant celebrities. Lisa's glad we got the bike. She enjoys riding but health issues have made it difficult.

Options and Accessories — RANS lists fenders, front suspension fork, rear rack, and mirrors as options for the bike. Fenders prove handy for keeping spray off the captain's legs and the stoker's back. Suspension may add a slight bit of comfort, but adds unnecessary complexity. The bike already rides smoothly on a variety of road surfaces. This is a good thing, since one can't use their body to absorb shock.

Racks are nice for making bikes practical, although I improvised a seat bag behind the stoker with an old front pannier. Pat Franz of Terracycle is developing an under seat rack which should prove to be quite valuable for touring. Mirrors on a recumbent are a necessity as it is incredibly difficult to turn around to look behind at traffic. I prefer glasses-mounted mirrors, but bike mounted ones work too.

Market Competition

Comparison — Recumbent tandems are a subset of a growing niche market. Not many are available. The 2003 RCN directory lists 12 models (2 being the Screamer variants). One major consideration is finding riding positions that both captain and stoker are comfortable with, and this may narrow your search.

The Sun EZ tandem appears to be a bargain at \$1,895 with disc brakes. It also has a claimed weight of 59 lbs. That might be a bit on the heavy side to power up hills, or lift onto a rack. It is a great value if both riders prefer the LWB position.

The Barcroft Columbia is similar to the Screamer Sport with the exception of overall length and drive wheel size. A friend and I test rode a Columbia a couple of years back and didn't like it. I was told it could be ridden hand off, but we would have ended up in the emergency room had we tried this. However, owners are pleased with their Columbias, and they only have a 54" wheelbase vs. the Sport's 74" one. This would make the bike more maneuverable in tight spaces and easier to transport. The dual 20" wheels would make for a little more convenience when carrying tires and tubes, but the high end gearing suffers. We definitely like our 123" high gear in the hills of Western Pennsylvania.

Value — In terms of tandem recumbents the Screamer Sport is a great value. \$3,400 is a lot of money for a bike, but in the tandem world it is a fair price for a high quality tandem. The stock inclusion of the drag brake is a nice touch worth at least \$120. With the RANS lifetime warranty on the frame and fork we plan on riding ours for many years to come.

Analysis

Verdict — One of our initial concerns in owning a tandem was transportability. Upright tandems don't present many problems, but recumbent seats make great bug catchers, tend to yield poor car fuel economy, and require significant time and effort to remove.

Since RANS utilizes the Rad-Loc™ system on the Screamer Sport, seats can be adjusted or removed for transport in just a few seconds. This is great, but my first captain seat clamp allowed the seat to easily slip under power. The person I spoke with at RANS about the situation suggested electrical tape over the inside of the delrin clamp to prevent slippage. This seemed to work until my dealer could exchange clamps for one that wouldn't fit over the main tube of the new V2 it came on. It fit the Sport well however, and the problem appears to be solved. Hopefully RANS can refine the Rad-Loc™ system so that the standard for recumbent seat mounting is raised.

One of my final complaints is very general. It involves the size of the stoker compartment. Many bikes only go to a stoker x-seam of 44" or so. Most manufacturers (Barcroft excepted) don't offer a longer stoker compartment even as an option. I might be able to stoke the Screamer at 6'1" tall, but would be pushing it. This rules out recumbent tandems as an option for some taller teams.

Tandem owners are definitely in their own subculture. If both parties riding the tandem don't communicate well the experience of riding together may end. For us, this is the greatest bike we've owned. It allows us to ride together, without arguing, which was nearly impossible on single bikes. It matches our abilities. Lisa is free to observe the surroundings, ignoring steering and traffic. I'm free to

hammer up hills and not have my wife fall behind.

The Screamer Sport is the ideal bike for us. I prefer SWB bikes and Lisa doesn't care. RANS is a good company and will continue to improve their Taiwan assembly, and the galaxy blue stock color is a wonderful metal flake finish, which is best seen in person. ♦



Right: Tandem and car

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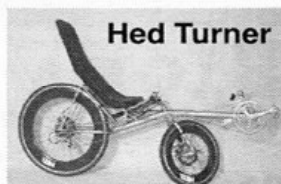
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Zach's BiGHA test bike (photo courtesy of Zach Kaplan)

figures were floated around before we learned the base price would be \$3,000, clearly in a different market area than the BikeE that came before it.

As any search of recumbent discussion groups on the Internet will show, the BiGHA has generated lots of discussion and even controversy within the recumbent community. Performance oriented riders scoffed at the idea of someone spending so much on a heavy recumbent with built in electronic gadgets. Others raised issues about connections with BikeE. Most people didn't seem to have much hope for the BiGHA, but I realized the enthusiasts who like to discuss recumbents on the Internet are only a small part of the potential overall bicycle market. Intrigued with the BiGHA design, I contacted BiGHA and requested a test bike.

The BiGHA is a bicycle that truly crosses the border in between CLWB and LWB OSS. The bike has a 26/20 wheel combination, unless you fit the small size frame with the 20/20 wheel combination. The larger sizes by actual measured wheelbase are LWB. However technically the BiGHA is a MWB because the crankset is directly over the front axle. By BiGHA's marketing strategy, it's just a "bicycling appliance" or "comfortable bicycle." You won't find any acronyms or use of the term, **RECUMBENT** in this camp.

The BiGHA is sold in a most novel way. It is sold only through the BiGHA website rather than through bike dealers. The BiGHA is shipped via truck in a very large custom box. It's shipped as close to fully assembled as it can be, and supposedly within the assembly/mechanical abilities of your average Internet

mailorder customer. Because of the uncertainty of buying without ever seeing in person or test riding the BiGHA comes with a 60-day money back guarantee. If you decide you don't like the bike within 60 days BiGHA will give a 100% refund and pay for return shipping. The BiGHA also comes with a five year warranty which is unlike any other warranty in the bicycle industry in that it covers everything, even consumable items like tires, tubes, batteries and brake pads.

BiGHA's website is large with lots of fancy graphics, and they are heavily promoting the bike with full page color ads in *Bicycling Magazine* but also non-cycling related magazines such as *Wired*, *Outdoors*, *Atlantic Monthly* and *Utne Reader*. None of the ads show the complete bike. Most are just abstract drawings with a few inspirational words and the website URL, another has a close-up picture of the rear suspension pivot. The target customer appears to be someone who has money, hasn't ridden a bike for a long time and is looking for adventure. While the bike is suitable for commuting, touring and transportation, adventure and personal exploration is the bike's mission, according to BiGHA.

Out of the Box

The BiGHA was very well packed and I had it out of the box and set up in a few minutes. On the initial test ride I noticed the rear derailleur wasn't shifting crisply so I dialed in the cable tension adjustment as I rode. Also the front brake was dragging lightly so I had to adjust the brake alignment.

As a recumbent dealer, I'd suggest that a bike shop give it the once over before the new

INFO AT A GLANCE

Specifications

Model — BiGHA
Type — MWB
Steering — OSS
Wheelbase — 47/51/57/61"
Seat height — 27-29"
Bottom bracket height — 27"
Weight — 44/46/48/50 pounds

Frame — Aluminum extrusion
Fork — BiGHA aluminum
Handlebar — BiGHA tourist
Stem — Aluminum adjustable
Seat frame — Aluminum
Seat base — Thermarest air adjustable
Seat back — BiGHA foam

Components

Crank/Cross-over — BiGHA FSA alloy
Bottom bracket — sealed
Derailleur (rear) — SRAM DualDrive
Shifters — SRAM DualDrive single side
Cassette — SRAM 11-32 9-speed
Chain — SRAM
Gear inch range — 21-114
Wheel (rear) — 559 mm 26" (20" small)
Wheel (front) — 406 mm 20"
Hub (rear) — SRAM DualDrive
Hub (front) — Sealed alloy
Rims — Alex DA 16 aluminum
Tires — Kenda Kwest 1.5 100 psi
Brakes — Avid mechanical disc
Pedals — Wellgo aluminum

Incidentals

Priced from — \$3000 delivered
Warranty (covers everything) — 5 years
Colors — Solar, Clay, Ocean, Sage
Options — 3-in-1 Bag set (\$275); pannier rack (\$95); Lock system (\$100); Fender rack (under-seat pannier) (\$50); Workstand (\$275); Heartrate monitor (\$50); Custom receiver hitch rack (\$275).

Pro

- High quality
- Well integrated design
- Many utilitarian accessories are standard
- Integrated computer with many functions
- Good handling & smooth ride
- 4 frame sizes
- High & safe riding position
- Disc brakes

Con

- Heavy
- Not aerodynamic
- Very expensive
- Electronics have some bugs
- Seat uncomfortable on longer rides
- Poorly built wheels (2 different bikes)
- Brakes and derailleur not adjusted
- New company with no track record

BiGHA

Phone: 541-738-4340
Web: www.bigha.com

owner hits the road.

"To insure quality, we wanted to do our own manufacturing. We bought a building, installed paint and machine shops, then hired as many good people as possible. We brought on several that had been casualties of the BikeE cut-backs." — John Acres, BiGHA

Systems

Frame — The mainframe is an aluminum extrusion, "flat and wide, like a 2x4", according to BiGHA's website. Many parts are CNC machined and there is over 80-inches of TIG welding on each frame. The frame has a high quality finished, designer look to it. All the cables and wiring are internally routed and there is a custom gasket that matches the contour of the frame extrusion where the cables enter the frame.

Fork — The fork is made from beautifully formed aluminum into a unique oval shape.

Suspension — The BiGHA doesn't have front suspension. The rear suspension works well absorbing shock and not bouncing under hard pedaling. It's a proprietary custom shock set up for each customer's weight. I suspect it to be a Taiwanese DNM hydraulic damped coil spring shock as used on the HP Velotechnik line of recumbents. A wide variety of spring are available to fine tune the ride to different weight riders. HP Velotechnik offers an adjustable damping version of it but BiGHA doesn't. I would have expected a more expensive, more sophisticated shock on a \$3,000 bike. It does appear various other high end MTB type shocks could fit in place of the stock unit.

Steering — The BiGHA has direct over-seat steering (OSS). The stem/riser is unique in that the mast angle is adjustable, offering many possibilities for perfecting the riding position to the individual owner. The stem/riser has a pivot mount at the base which is infinitely adjustable, even as you ride. I like the high quality steering column. The handlebars can be moved fore and aft while riding (like the tilt steering wheel on a car). My arms were fairly extended even when the handlebars were as close to the seat as they could go. Some riders will prefer the handlebars closer to the seat. The handlebars can also be moved up or down by through use of a quick release. I ran the bars as low as they could go and don't see why anyone would want them higher as they were still quite a bit higher than my knees. I'd prefer a lower range of adjustment.

Weight — The BiGHA is HEAVY. I weighed the large size test bike without pedals but with the lowrider rack and the supplied bottle cage at 22.8 kg (50 lbs. 4 oz.). When I added my very lightweight Bebop pedals to it so I could ride it the weight went up to 23 kg (50 lbs. 12 oz.). When I added the optional 3-in-1 seat bag, tool kit, patch kit, pump, empty water bottle and empty Platypus water blad-



BiGHA's John Acres (photo: BiGHA)



Above: The BiGHA console

der the weight went up to 25.7 kg (56 lbs. 10 oz.). That means as I rode it with some water the total vehicle weight was well over 60 lbs. That is really an incredibly heavy weight for a single person bicycle, even heavy by tricycle and tandem recumbent bicycle standards.

The build quality, details and finish quality looks much like a high quality Japanese automobile. All are much more refined than other recumbents we've seen. Many high end recumbent are as refined looking but in an old school way, they don't have the automotive looking extrusions and internal wiring. The automotive analogy is in regards to appearance. The bike hasn't been around long enough, however, to have earned the reputation for dependability and durability that Japanese cars have.

"I'm not one for technical discussions about specifications, gears and metal alloys and I don't fit in with the racing crowd where the goal is to get from one place to another in the shortest time possible." — John Acres, BiGHA

Drivetrain

Components — BiGHA utilizes the SRAM

DualDrive hub to give it 27-speeds all shifted by the right hand without the use of a front derailleur. The component level is essentially ESP 7.0, which is found on recumbents priced in the \$1,000-\$1,300 range. The SRAM DualDrive is an internally geared three speed hub, with 9-gears on the cassette. All shifting is done on the right side of the handlebar. The DualDrive is actuated by a thumb shift, while the rear derailleur is shifted by a SRAM twist shifter. I found the thumb shifter somewhat stiff to operate but at least the 3-speed hub can be shifted while pedaling under load unlike the previous generation 3x7 hubs. The ability to shift the 3-speed hub while stopped or coasting is useful in traffic.

Chain Management — The BiGHA has a cross-over mid-drive/2-chain drivetrain. While the mid-drive keeps the chains shorter and arguably more manageable, it adds weight and complexity to the bike. The mid-drive does keep the chain line close to the rear suspension pivot to minimize the effect of pedaling on suspension movement but it seems this could have been accomplished in a simpler manner. The front timing chain needs to be tensioned periodically by adjusting the eccentric (tandem style) bottom bracket (BB). I'm not sure that the average BiGHA rider would want to monitor the tension of the timing chain and make these adjustments.

There is a chain tube on the front chain to keep the rider chain lube off the rider's clothing or leg. At 400 miles, the (front) timing chain was slapping the frame when I rode over bumps. I didn't make any attempt to adjust the timing chain tension as I wanted BiGHA to see how loose the it was when they took the bike back.

Gearing — The BiGHA gear inch range is 21-114 (20-108 for small frame with 20" wheels). This is too high for such a heavy bike in my hilly area. Based on the type of first gear I need on somewhat lighter weight trikes I'd need a 14-15" first gear to ride a BiGHA up some of the hills around here without risking knee injury. Also I find the high top gears pretty useless for a bike with so much frontal area. The top gear on my Bacchetta Aero is 106" and I find that to be plenty.

For the average out of shape person who hasn't ridden a bike in years that BiGHA is targeting the gear range should be around 15" to 95."

Braking — The BiGHA has front and rear Avid mechanical disc brakes. These are high quality brakes that stop efficiently and quickly, and are easily adjustable. Avid mechanical disc brakes have an excellent reputation and are considered the best of their type. In most cases, a turn of the thumb wheel mounted on the caliper will move the pads closest to the rotor.

Wheels and Tires — BiGHA's come with a 559/406 mm (26/20") wheel combination, except for in the small size, which is a 406/

406 (20"). I prefer the 559 mm (26") wheel for lower rolling resistance on the relatively heavily loaded rear wheel. I don't believe it has a gearing advantage on the BiGHA due to its use of a mid-drive jackshaft and DualDrive hub. Most other *metro* style (CLWB) recumbents such as the Sun EZ-1 and HP Velotechnik Spirit use 406/305 (20/16") wheels to achieve a more compact bike that is easier to get on transit and into elevators. Even though the BiGHA is a MWB with the pedals over the front wheel the large size model ends up being a long bike.

The Kenda Kwest tires are good medium width utilitarian slick tires and reasonably puncture resistant. The tubes are filled with sealant which will self-seal small punctures on the tire.

The wheels were poorly built with inadequate tension and at the end of the test the rear spokes were extremely loose.

Comfort

Seat — The BiGHA seat can be easily adjusted or removed relatively quickly and with no tools. The seat adjusts fore and aft, the recline adjusts and you can tilt just the seat base independently of the seat back. Installing the seat is more difficult than removing it as four horizontal pins need to be lined up with holes in the complex machined slider that remains on the seat track when the seat is removed. The fact the slider remains on the seat track on the frame does have the benefit of preserving the seat fore-aft adjustment position.

Installation of the seat is made more difficult by the weight of the seat. Also the 3-In-1 bag contacts the rear rack while making it virtually impossible to line up the seat pins without removing the seat bag. Removal of the seat bag requires disconnecting two buckles, pulling two hook and loop straps and pulling the hooks up from around the seat back cross tube.



The unique BiGHA seat with airbag base



BiGHA rear suspension

"Seat development alone consumed hundreds of thousands of dollars. I dictated the addition of electronics, not because I like gadgets but because I believe in safety and security. I cannot imagine buying a car without lights or speedometer and I don't understand why bikes are sold without them either." — John Acres, BiGHA

If one is transporting the BiGHA seat removal/installation is a frequent event both to reduce the weight of the bike to make it easier to load into or onto the vehicle and to reduce the height of the bike as with the seat installed the bike is quite tall, too tall to sit upright inside most mini vans. The steering mast also needs to be folded down for transport as the handlebar to ground height is also quite high. Even when transporting the BiGHA in a motor home where there was no vertical height restriction I still had to remove the seat just to make it easier to carry the bike inside.

The seat back is molded high density foam with many ventilation holes bonded to a thin, hard plastic shell which is mounted to a relatively narrow aluminum frame. I've never seen a recumbent seat back with this method of construction before. The hard shell at the back of the seat back has some sharp edges and I cut my finger while trying to lift the bike up by the seat.

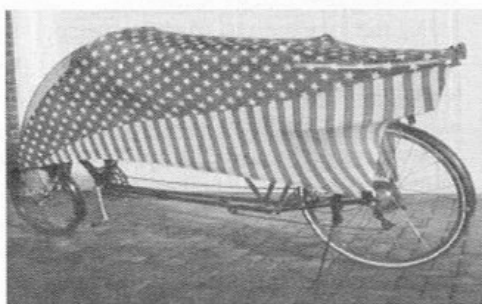
Unlike mesh seat backs the BiGHA seat back doesn't have any noticeable give in it yet the ride was still smooth due to a large amount of rear suspension travel. The seat is more upright than I'm accustomed to, but it has a good range of adjustment for the average short distance rider. I like the way the seat angle and seat to pedal distance can be adjusted on the fly. It reminded me of a car seat in this respect.

The seat track has calibrations in inches on it for keeping track of where the seat is positioned if various riders are sharing the same bike. The bottom bracket is high for this *metro* type (CLWB) of recumbent and that results in a more closed pedaling angle which provides better aerodynamics than a BikeE. It felt like a Vision R32 in this respect. The fairly closed pedaling angle combined with the stiff seat back contributes to the responsive feel — as the BiGHA accelerated like a much lighter bike.

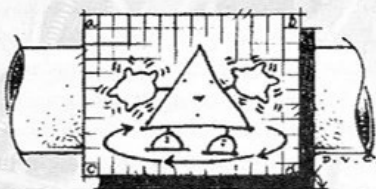
Interestingly even though the BiGHA seat

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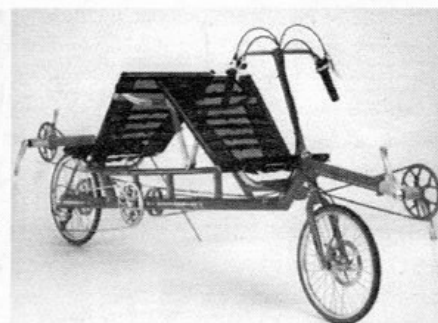


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back doesn't appear to have any give in the fore-aft direction when pushing hard on the pedals the mount at the base of the seat does have enough play in it that the seat can be rocked side to side. This isn't noticeable when riding the bike but is while off the bike, particularly if pushing it with one hand on the handlebar and one hand on the seat back with a heavy load on the rack.

The seat base has a custom shaped air bladder over a hard plastic shell. It uses the same self-inflating technology as a Thermarest pad. The air pressure can be adjusted while riding by turning the valve under the seat base. The covering on the air bladder feels much like a Thermarest pad, it's a non-breathable relatively slick polymer. Despite being non-breathable I didn't find it especially sweaty. It does have the advantage of not absorbing water, unlike the Lycra covered spongy foam pads found on many recumbent seats.

I rode the BiGHA in the Seattle To Portland ride the second weekend of July. This was a 206 mile in two day ride and I rode 110 miles the first day. The majority of riders doing this ride take the two day option though I would have done the one day option had I been on my Gold Rush or Aero or even one of my more laid back performance oriented trikes.

Fifty miles into this ride I developed an intense pain in the working muscles I was sitting on. This condition is known on the street as "recumbent butt" and generally affects those who are sitting on seats that are relatively upright, thus placing a high percentage of the rider's weight on their working muscles. I

found decreasing the air pressure in the base pad helped somewhat, but the real answer to eliminate this problem is to recline the seat back more to take the weight off the working muscles and spread it out on the rider's back. I had already laid the seat back as far it could go. I'm told BiGHA is redesigning the seat base mount to make it both simpler to produce and to allow running the seat at a more laid back angle.

I didn't find the seat back to be particularly comfortable for long rides. It was very breathable with the large vent holes but it lacks lumbar support and the back rest isn't very tall. The overall feel of this seat was more one of sitting on the seat rather than in it. I found it more comfortable than any upright bike seats, but less comfortable than other recumbent seats. This isn't a problem on short urban rides but is a major problem on rides of 50 miles or longer.

Ergonomics — The seat to BB height relationship feels like one of the lower BB SWB bikes such as a Vision, and the seat angle and arm position feels very Tour Easy/Gold Rush-like. Unlike BikeE's that had excessive arm reach this one puts the bars in a place the majority of riders will probably find comfortable. I like the way the steering riser angle and seat angle can be changed while riding. The position is overall user friendly and doesn't have any tiller effect making for excellent low speed handling. The bike and seat are very high. There is an optional small size frame with 406 mm (20") wheels and is lower overall. The tall riding position makes it feel like the SUV of

recumbents. I found myself looking down on cars, something I'm not used to when riding in the recumbent position. This also meant catching lots of wind which proved to be tiring and slow on longer rides. It's less of an issue for short distance urban riding.

User friendliness — This isn't the most user-friendly style of recumbent due to the bike's seat and BB height. However, the high center of gravity and stable steering geometry work to its advantage making for good stability. I brought the BiGHA to Burning Man (www.burningman.com) and used it for my transportation the nine days I was there. I let many people who had never ridden recumbents ride it. Most were able to smoothly ride it right away. Many people upon picking it up or asking how much it weighed displayed shock at its weight.

Ride and Handling

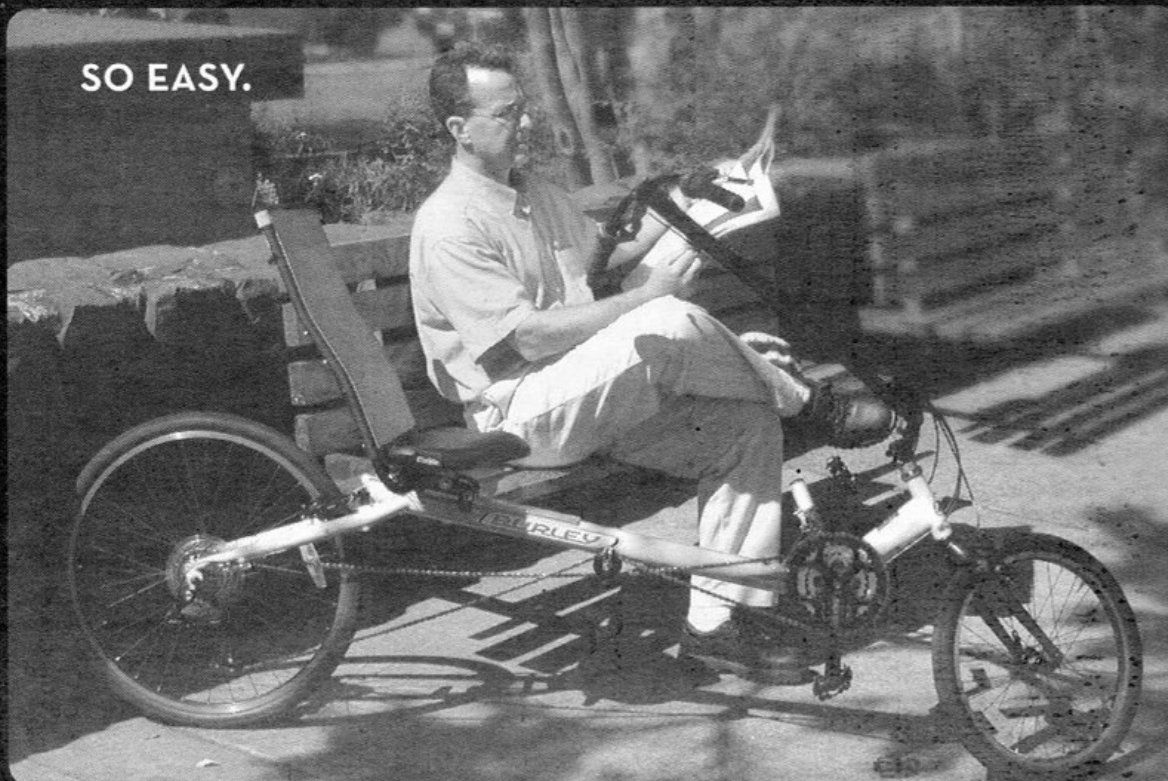
Stability — The handling was very good from walking speed to an indicated speed of 35 mph I reached going down a hill. At higher speeds I was able to take my hands off the handlebars. The handling felt much like a good upright bike.

Maneuverability — The BiGHA maneuvers well and there is no heel/front wheel interference. The bike's balance is good, as is usually the case with tall recumbent bicycles.

Performance — I was expecting something only slightly faster than a BikeE due to the larger diameter wheels, but I was pleasantly surprised by the performance level of the

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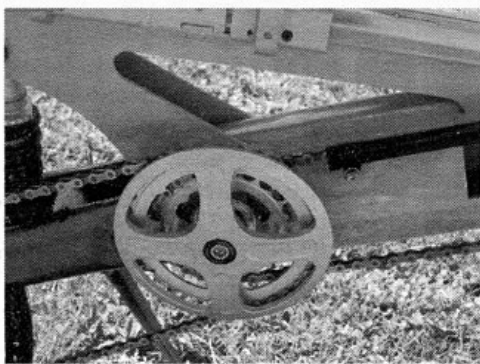
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BiGHA. The acceleration was surprising and it climbed well for its weight. Level ground speeds were significantly lower than I'm used to due to the high frontal area of the upright seat position.

Rapid acceleration is an important feature for an urban bike. The only time I really noticed the weight was when carrying the bike and then it's really noticeable. It weighs more than my heaviest trike. This could be a problem for people who need to carry the bike up or down stairs or lift it up to a roof rack on a car. The BiGHA website points out weight is a relatively minor issue when riding and I tend to agree, unless the rider is relatively light weight and wants to make good time on a hilly ride.

Based on my level ground speeds the aerodynamics seem to be better than other metro type CLWB recumbents (BikeE, Cannondale and HP Velotechnik Spirit). Some of this may also be due to the larger wheelset on the BiGHA. I'm usually riding in the 16-18 mph range on level ground. On one commute, I was riding at 23 mph with a tailwind and 13 mph into the headwind. On the tricycles and HP Velotechnik Street Machine GT I normally use for around town riding my level ground cruising speed is 18-20 mph. Although not a fair comparison, as I wouldn't be using these bikes for around town errands, when I ride my Gold Rush with body sock or Bacchetta Aero I usually cruise in the 22-24 mph range. With the same effort level I'd be riding the BiGHA at 16-18 mph.

I had some very hilly, fast paced club rides scheduled for the 4th of July weekend and did those on my Bacchetta Aero which with ped-

als and seat bag weighs less than half the weight of the BiGHA without pedals. I didn't think I could keep up on the BiGHA and knew it wasn't the appropriate bike for the ride (most of the riders are on titanium or carbon fiber road bikes).

Utility

The BiGHA comes standard with a platform type rear rack. Packages can be strapped to the rack though traditional panniers won't fit. Our test bike had the optional low rider rack which take standard panniers. This rack puts the panniers down below the seat ahead of the rear wheel for good weight distribution but it is rated for only a 30 lb. load. This is about half what the custom racks on heavy duty touring recumbents will take.

I rode the BiGHA to our local farmer's market and received numerous "cool bike" comments. One vendor appreciated the fact the seat height was so high saying she doesn't like the way other recumbents put the rider down at automobile exhaust level! I know BiGHA doesn't call their bike a *recumbent* but she identified it as such.

On another occasion I took the BiGHA on the Bay Area Rapid Transit train system which has roll-on bike access. I was carrying enough gear for a week long trip with two Ortlieb panniers and an Ortlieb duffle bag strapped across the top of the rear rack. The bike handled well fully loaded. However, it was difficult getting through the train station as the bike barely fit in the elevator and was awkward and heavy. The standard long arm kickstand also wasn't that stable when the bike was heavily loaded.

Options & Accessories

Electronics — One of the selling points of the BiGHA is the integrated electronics package. All cables and wiring are internally routed. The computer's console has a large LCD display with an electroluminescent backlight for night riding. The system is powered by six AA batteries. The computer includes: Current speed; Distance (odometer); Ride Timer; Compass (direction); Altimeter (altitude); Humidity (0-99%); temperature; headwind; time and date; cadence (pedaling rpms); heart rate. The system also includes a white LED headlight, red LED taillight, LED turn indicators and a peizo-electric horn. Finally there is a coded touch key alarm system integrated into the rear fender/rack, although this feature wasn't operational on the test bike.

For years I've dreamed of having an integrated electronics system on a bike with a computer giving simultaneous readings of speed, cadence, heart rate and altitude. The BiGHA computer does all this plus all of the above. Ride statistics are stored on a memory card that can be downloaded to a computer. This way they can also send out software upgrades as new features are added. The white LED headlight, red LED taillight and display backlight switch on automatically when it gets dark and the headlight has three intensity level options. The integrated turn signals are red in the back and amber in the front. I wish they were amber in the back too for better visibility and for meeting international vehicle marking standards. I also wish they had more separation, so they would be more effective.

The turn indicators switch off once a turn is made through use of the compass. I found when I really needed to signal a turn it was most effective to just stick my arms out to the side as I normally do rather than waste time fumbling with the buttons to operate indicator lights might be too close together to be really effective out on the road and too dim to be really effective on a sunny day.

The motion detector which operates the alarm system also switches the brake light on when the brakes are applied. While riding Seattle To Portland I discovered a glitch in the brake light system. Several other riders reported the brake light was randomly flashing as I pedaled down the road. I met up with John Acres on the ride who was riding his BiGHA and he explained they are working on the software to filter out input from the motion detector so the brake light will only come on when the rider is braking. They will send out a software upgrade when they have this corrected.

The cluster of white LED's comprising the headlight are adequate for use as a "be seen" light in a well lit urban environment but are inadequate as the sole source of front illumination at my normal cruising speeds on unlit roads. The brake and shift cables cross over the front of the headlight lens partially block-

ing some of the LED's.

The horn has a somewhat annoying electronic sound, and it isn't very loud. However, the horn is good for alerting pedestrians. When the horn button is pressed the horn emits three short beeps. I would much prefer the horn to operate like a car horn where it emits a beep for however long the button is pressed. That way I could give a very brief beep for alerting pedestrians or give a long honk if the traffic situation warrants it. BiGHA's Lee Eckroth told me there will be a software upgrade that will allow users to configure how the horn operates and also to customize the instrument display. Another disconcerting feature of the horn is the fact it is located in the rear rack rather than at the front of the bike so the sound comes from behind the rider. After riding through some rain I noticed the horn developed a warbled, waterlogged sound but it returned to normal when things dried out.

I didn't have any electronic failures, but I did have some trouble with the computer and software, since I wanted to run it in metric mode. BiGHA wants to sell the bike in Europe, so perhaps they'll make metric software available. I found the computer system awkward to use at times. Sometimes after pressing the left turn signal button nothing would happen. This usually happened if I pressed the button for longer than just a brief tap. Also when I brought the bike inside the headlight and taillight would automatically come on so I had to use the left turn signal button to cycle it down from high to medium to low to off. If I went out again and then come inside the same thing happened again and I had to manually turn it off again. It doesn't seem to remember that I want to keep the headlight set to off and not go on automatically. My computer also didn't have cadence readings as they had forgot to install the sensor.

The first generation software on the computer on the test bike also had a power consumption problem. The supplied set of AA lithium batteries died after 250 miles of daylight only riding and all the odometer information was lost when this happened. I don't like the concept of using wasteful disposable

batteries so I replaced them with rechargeable NiMH batteries and only got about 100 miles of riding on these with about 40% of that riding being at night with only the lowest headlight setting on. When the batteries went dead this time they also did so without any warning and the odometer information was erased. Even worse, it happened at night while I was in a remote section of desert. Luckily, both for redundancy and due to the inadequacy of the integrated headlight I had a head mounted lamp that got me back to my camp. Luckily I had installed some blue flashing electroluminescent wire on the seat back since the taillight also went out. Lee Eckroth told me they are working on new software which will improve power management and greatly increase battery life. It seems there should be a battery "fuel gauge" and also a backup battery for the computer.

Replacing the battery is tedious. First you must go to the tool kit in the 3-In-1 bag and get out the Torx key to loosen a set screw on the knurled knob of the battery compartment cover at the front of the rear fender. Then the knob is turned and the cover released. The cover has is made of thin plastic and has a cheap feel like it could break easily plus it is a loose part that could get lost while changing batteries in the dark. Next you reach in and find the short cord, pull on the cord and the battery compartment slides out. Another cheap feeling plastic hatch is then removed from the battery compartment exposing the 6 AA batteries. When sliding the battery case back in, you must be careful not damage the power cord.

There is a jack on the fender but it isn't for charging, it is for some future development, perhaps trailer lights. It seems like there should be an external charging jack and smart charger as standard equipment, especially considering the sophistication level of the rest of the electronics package.

Fenders — The front fender is a really slick looking wrap around carbon fiber work of art that attaches and detaches from the fork quickly. Unfortunately it doesn't have much clearance with the stock Kenda Kwest 40-406

front tire. BiGHA's Lee Eckroth told me the fender is now mounted higher up so there is more clearance.

The fenders keep you clean and dry in wet conditions. BiGHA's rear fender does that and more: it also contains electronic sensors, security alarm, and rear safety lights. Plus, it allows you to carry up to 30 lbs of cargo. However it only covers the top of the wheel thus doesn't provide any protection to the shock absorber or whoever is riding behind you.

The fender houses 6 AA batteries that power the electronics. From here, internally routed wire runs through the frame and handlebars to the console. Enclosing the wire gives the bike a more finished look and helps ensure reliability. Turn signals and a taillight are two key safety features of the rear fender. A built-in sensor detects deceleration and will automatically illuminate the light. The quicker you decelerate, the brighter the light will shine.

Security — Finally, the rear fender contains BiGHA's security system. Simply activate by touching the security key to the touch plate. In less than a second the bike is armed. If anyone moves the bike, a warning sound emits. If movement persists, a 100-db alarm will blast,

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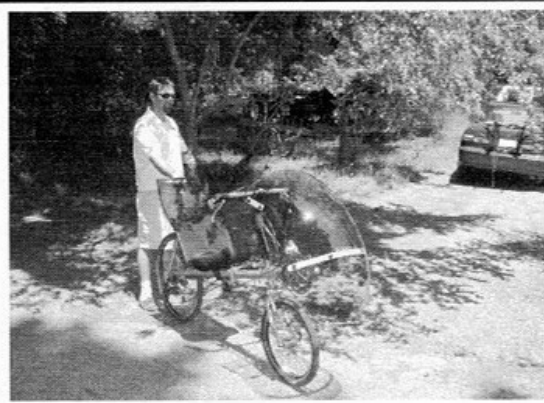
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scaring off any potential thieves. When you're ready to ride again, turn the alarm off by touching the security key to the touch plate. Unfortunately I didn't have a chance to test out the security system as the software for it hadn't been fully developed, but early buyers will be given software updates at no charge when available.

3-In-1 Bag — This proprietary system of three modular bags is very high quality and has many small compartments sized specifically for various items such as tool kits, the hydration bladder and mobile phone. Unfortunately the largest of the three bags isn't very wide and has insufficient space for a notebook (either the type with paper or a computer). If one wants to transport a computer on their commute they are going to have to use a pannier on the optional low rider rack and that will induce more frontal area and add more weight than a good large capacity seat bag would. I'd rather see a large compartment seat bag like the Radical Design bag that HP Velotechnik had made specifically for their Spirit model. While the 3-In-1 bag has some reflective stripes on it the bags are all black. For safety there should be a bright yellow or orange option such as Radical Design offers.

Market Competition

Comparison — About the closest competitor

to the BiGHA is the \$2,200 Cannondale (see RCN 069) and \$1,695 HP Velo Spirit (see RCN 075). Both are significantly lighter weight bikes and much more affordable. However, both have 20/16" wheel combinations.

Value — While the build quality is excellent, both the sizing and shock set-up and high price makes resale a question. The value of a used BiGHA may require the purchase of a new shock to be considered, and it depends on how well BiGHA sales go. The detailing and quality on the BiGHA does make it look as expensive as it really is. The quality level is quite high with some exceptions, but those may be due to the fact that the test bike was an early production model.

Analysis

Verdict — The BiGHA looks to be a really nice bike for urban riding on rough, congested roads in relatively flat areas. It lacks front suspension, though the front wheel seems fairly lightly loaded and the 406 mm (20") wheel will go over road hazards better than the 16" front wheel on similar bikes.

There's no hiding the fact that the folks who brought you the BiGHA also brought you the sometimes problematic BikeE. BikeE had many features that were under-designed, prone to failure, or were bad designs and recalled.

For me, the crucial point of BiGHA's success will be how the bike holds up over time and hard use. Are those electronics really waterproof and long term vibration proof? I also wonder how parts like the cantilevered seat frame will hold up and suspension swing arms when the rear wheel was twisted side to side. Maybe the fact it is all being made in-house rather than in Taiwan will allow them to keep the necessary quality control.

BiGHA has lost invested in the design of this bike, the production facility, and advertising. They will have to sell a lot of bikes to break even, and while there is a market for this sort of bike I'm not sure it's that big at the \$3,000 price point. It's good to see them introducing something truly different, however.

Editor Comments — We would like to offer special thank you's to BiGHA's Lee Eckroth, Ernest Kim, Dave, Noah, John and others at BiGHA who made arrangements for our two test bikes, Zach's factory tour, return shipments, updates, photos, questions, etc. Our road test experience was made easy by these friendly folks.

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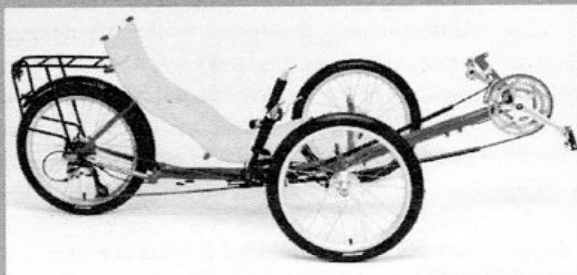
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Research indicated that even with our centrepivot steering, there was some toe-out under heavy braking with the optional hydraulic disc brakes. Thus the steering has been re-designed to give a small amount of stabilising toe-in under braking. The difference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

NEW LUGGAGE RACK

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

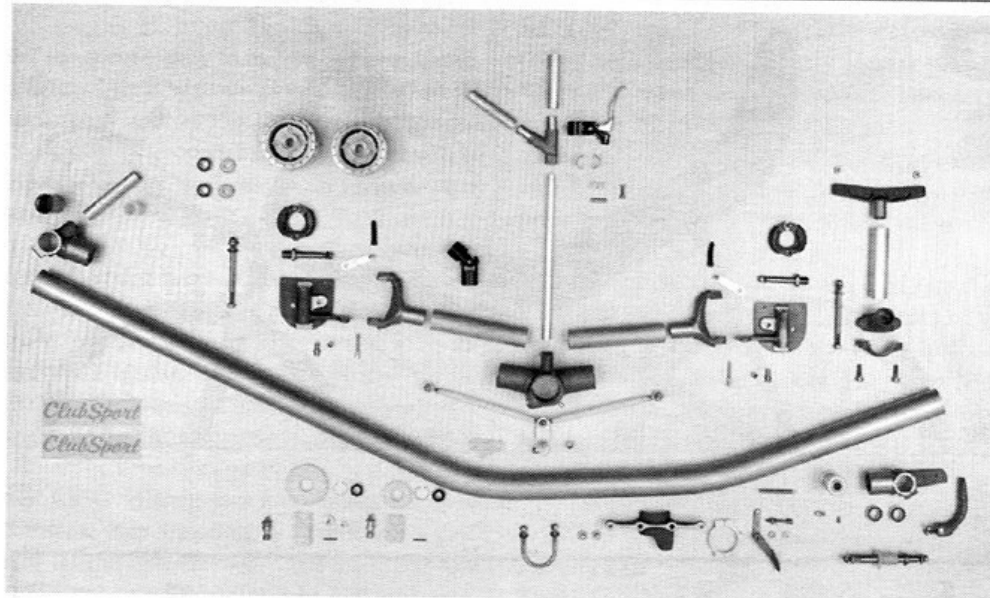
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A Windcheetah For The Rest Of Us

By Steve Baker
trinitysb@msn.com

Bob Dixon likes British motorcycles. He's involved in an effort to resurrect the Norton Manx (and a very tasty version it is). That should tell you all you need to know about his other project, the Windcheetah. Those who crave more detail may wish to read on.

Like Jaguars, British motorcycles inspire equal parts of enraptured devotion and self-loathing. When things are running well all's right with the world. When something breaks, (and something always will), we curse a lot and scan the ads for a Honda. Yet, we keep coming back for more. This love-hate quality, which we often call *character*, is present in great quantities on the human-powered side of British sporting vehicles as well. Thus begins my story.

I thought I'd fallen in lust with a Dragonfly trike. Tucked inside the front cover of RCN 046 was a bit-too-dim portrait identified as Earth Cycles' newest. I was to discover later that the captions had been switched and that in reality I was seeing the Windcheetah for the first time. It was then an academic question, since even at my self-indulgent best I couldn't meet the price tag on a Windcheetah.

Then imagine my surprise and delight, when in the Fall of 2001 it was announced that the Club Sport would soon be available in kit form at less than half the price of the one in that picture! I can put bikes together; what could be so hard about this one? I was at the head of the line with an order. The winter passed and as I awaited the arrival of my kit a growing collection of components filled the workbench. I read, and re-read the assembly manual. I

often gave AVD a call or sent an email as impatience got the better of me.

In March of 2002 a large cardboard carton appeared on the front porch. Inside was a collection of fittings, screws, and hardware taped and bubble-wrapped around a long monotube frame. Number K628 had arrived!

It took 8 months to assemble it. Much of that was my fault. Along the way I had plenty of opportunities to appreciate the British Bike Syndrome, but I still love it.

First impressions were positive, since very fitting, and every assembly step had an individually labeled bag of parts and hardware dedicated to it. In the assembly process there was never a time when the identity of the right piece for the job was in question.

Then there were the larger components. As I unwrapped each one I could only think, "these are jewels!" The precise engineering required to create the Windcheetah was immediately evident and impresses me to this day. The operating tolerances on this trike are extremely close and the fact that the controls work so effortlessly without fouling an operation just a few millimeters away is proof of the thought that went into this design. The carbon fiber parts were nearly weightless and beautiful to behold.

Assembling a kit is fairly straightforward. It shouldn't take a reasonably careful person 8 months. Several components must be bonded onto the frame with one of four choices of adhesive. A large proportion of the total assembly time is taken up by overnight drying of the adhesives. Beyond the assembly of the frame most of the work is no more involved

than building a conventional bike up from a frameset.

The frame bonding itself was unexpectedly complex. Mechanically it merely involves inserting a few fittings into predetermined places on the frame, determining the proper alignment, and bonding with Loctite. As an aid to getting started AVD have cleverly designed the right side of the rear fitting, which holds the bearings and mounting points for the derailleur hanger and tailbox, to lie flush with the side of the frame tube. If the tube and frame are dry-assembled while both lie on a flat level surface you get a reference point for bonding the rear casting which in turn will become a reference point to help align the bottom bracket up front. AVD then recommends just eye-balling the rest of the fittings relative to the front and rear castings.

Lesson #1

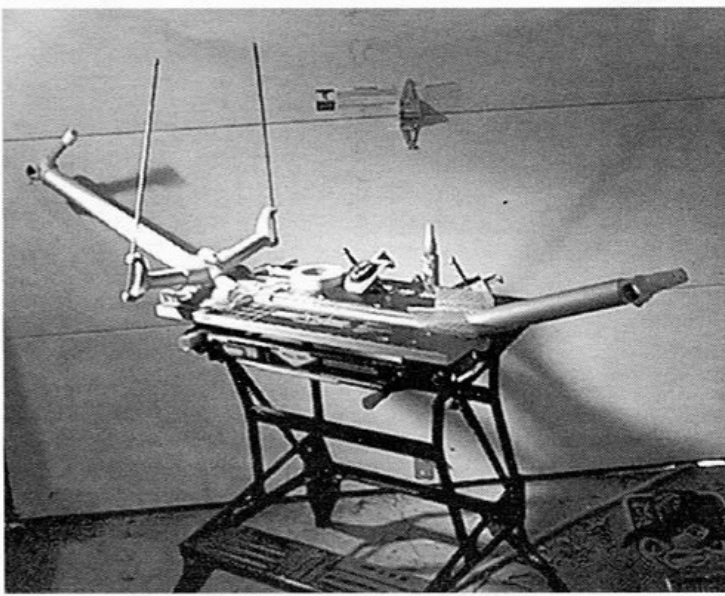
It will come as no surprise that a fairly high percentage of recumbent riders are over 30. Along with aging comes a tendency to profit from bifocal lenses in the glasses. Bifocal lenses, coupled with a slight astigmatism, can give me problems on spreadsheets, not to mention on the larger scale of aligning major frame pieces by eye. I tended to get false positives when aligning things with strong horizontal features (such as a trike frame). As a result the center cruciform fitting was misaligned. Fixing it caused much delay and foul language. Those who order the kit would be well advised to consider building a jig to hold things in alignment mechanically. It wouldn't be that difficult to do.

Bob and Jerry at AVD, who both seem to be great guys had to bail me out of the frame mess. Unfortunately, that took a while. When things came back from England I was able to use the position of the factory-fitted center casting as a better reference point to get things bonded together in the right places and attitudes.

Lesson #2

Loctite has a shelf life! Loctite is expensive, making one reluctant to throw it out. When I bonded the components to the frame the second time around I used the Loctite that had been opened six months earlier. The joints seemed to hold but a critical one failed under heavy braking shortly after getting on the road. I then noticed that my number plate was sliding slowly down the frame tube. It had been installed last of all, by which time the glue had given up any pretense of hardening.

The good news is that such mistakes are relatively easy to rectify. A propane torch on the joint will quickly break the bond and allow the fitting to come apart. Steel wool, followed by an acetone wash, cleaned off the residue and readied the joint for fresh adhesive. Fresh Loctite is holding well and has since survived lots of heavy braking.



Bonding is almost done. Note alignment rods in the hubs.
(photo credit: s. baker)

Once the alignment and adhesive problems were ironed out the rest of the trike went together with surprising speed. The instructions are clear, with a few minor exceptions, and the technology is familiar. Only one more Lesson awaited.

The instructions suggest that you use taps of various sizes to clean out the powdercoat residue in the threads of the castings. Unfortunately, in most cases they specified only the diameter, not the gauge of the tap. I used what I had and found that I had turned some fine threads into coarse, which of course made it difficult to fit the specified parts into them. It was helicoil to the rescue! Hopefully the instructions have been modified by now.

It was time for the first ride, just as the Winter's first ice storm began pelting down. I worked out a lot of fine-tuning on the trainer over the winter as the snow flew outside.

Before moving on a word about the process might be in order. If you can change components on your bike you can build a kit. The support from the factory is good; they seemed genuinely committed to seeing me on the road and happy. You are, however, dealing with a small custom shop. When you have their attention you have it without reservation. E-mails are answered promptly and problems are handled in a more than fair fashion. When someone else is getting that attention you may wait a while. If you're not prepared for that you probably aren't temperamentally suited for the custom bike process. I'd do it again, and may. I keep thinking about interesting color schemes.

The trike has a few options on it. I opted for the tailbox over the

front fairing, hoping that increased storage space would come with the aerodynamic advantage. It makes the ride a bit noisy but works fine. AVD's front fenders are carbon fiber beauties which work well with tires of reasonable width. They're very nice to have when puddles appear as they provide a lot of protection. The only other option was selecting the carbon fiber seat over the standard fiberglass version. I think it looks SO COOL.

So, what's it like on the road? The first test was seven days of the GITAP (Grand Illinois Trails and Parks) ride, 475 miles in one week. This is a great way to get to know your bike.

Those unfamiliar with the Windcheetah will find it a simple, yet elegant, design. A monotube frame runs front to rear. While strong, it requires that the rear wheel be offset, in what has become a trademark of Mike Burroughs' design. The offset can't be detected while riding but it is a great conversation starter. From the very comfortable driver's seat the view is like any other tadpole trike, except for the joystick.

The joystick is unlike most other trike steering systems on the market, but it works beautifully. You can pedal along with the upper body entirely relaxed, ready to steer using just the fingertips. The quickness of the steering is probably the most disconcerting thing for first-time riders but it soon becomes second nature. At anything over a slow walking pace, steering is done more through pressure on the stick than by actually turning it. Roaring down hills while steering with slight movements may sound a bit scary, but is in fact one of the steadiest, confidence-inspiring features of the trike. Use your fingertips; they're more than strong enough.

One of the nice things about frame up building is the ability to mix and match components. I was able to scrounge some deals on Ebay and through catalog sales and ended up with an Ultegra triple drive train. I later put on TA chainrings to drop 4 teeth off of each ring so that there would be low gearing available for the hills to come on the GITAP ride. That proved to be a very wise decision. The largest cog that will fit comfortably on the rear cassette is 28-teeth, so granny had to live with the front chainrings. 26-teeth up front did the trick on some very long hills. I now have a very close-ratio Dura-Ace 12-27 in the rear and 26/38/48 up front. I really like the close gears for hammering along some twisty woods trails near my house.

The chain is managed by two guides and two rollers. Here again is a clear example of the engineering on this beast. It's a good clean run through tangled, crowded space and works well. When setting up the trike it is a good idea to align the guides so that in the most commonly used gears the chain enters the guide at a right angle. That cuts down on a lot of drive train noise.

The brakes are drums on the two front wheels. They are connected to a single lever, making the initial adjustment a bit tedious. The good news here is that it hasn't been necessary to adjust them for over 600 miles so I think they're right where they should be. Braking power

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seems to be increasing as shoes and drums wear in to each other. I'd go for discs if they were available.

Drop into that comfortable seat and you'll find yourself in a wedgie-bike tuck position that has been rotated 90 degrees or so. The bottom bracket is relatively low, which means your heels will drag on some curb crossings. The position felt immediately familiar and comfortable and let me concentrate on my pedaling technique without distractions.

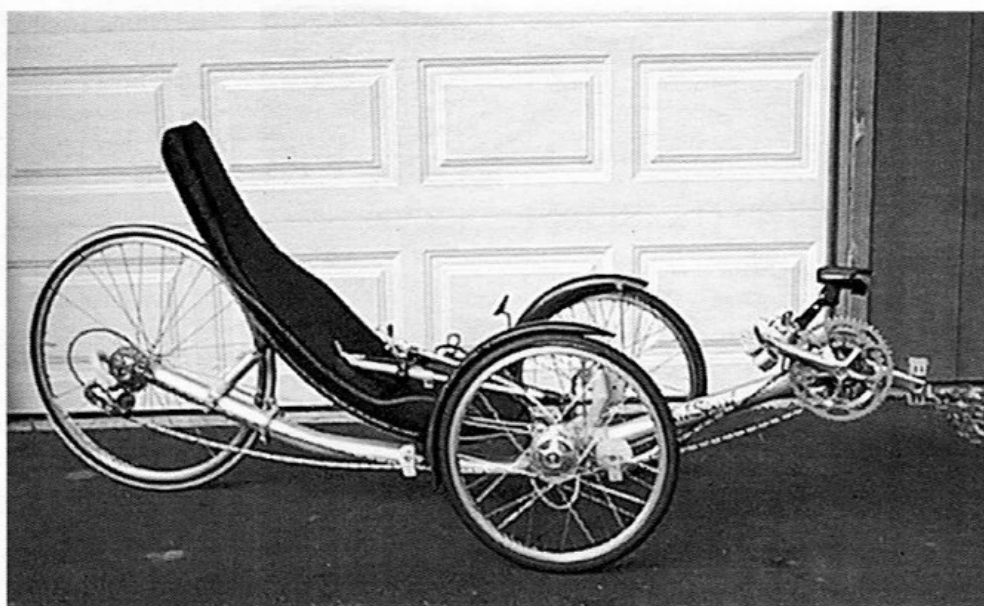
Powercycling.com made me a covered mesh pad that works pretty well in hot weather. The stock pads would leave me swimming in a puddle of my own sweat, I fear. Although a wet back in very high humidity conditions is unavoidable, I can feel the air circulating as I ride. Pedaling seems to pump air through the seat mesh. I also use a 2" uncovered pad from Gaerlan that is pretty comfy, too.

This trike is fast! I was instantly able to match speeds I was getting on my RANS V2, a bike that I'd ridden for years. I'm not really a fast rider but it's nice to be able to keep up with my friends. On the long downhill of the GITAP ride I left everyone in the dust and, I was just coasting! Not to worry, though, they caught me on the up slope.

By the 500 mile mark I had decided that the ride was way too rough, that the steering was way too sensitive, and that pedal steer was too intense. It eventually all came down to the carbon fiber seat which, though beautiful, hadn't proved durable enough on the rough roads and trails. The four mounting points gradually hammered themselves through the seat and the seat/tailbox combination lost a lot of rigidity. The loosening of the structure made things begin to sway. This chassis responds to almost any input and the movement in the seat and tailbox as the mounting points degraded turned instantly into steering movement. Powering down hills got to be very interesting! Ultimately the tailbox even began grind on the rear tire, at which point I removed it and was able to finish the ride. (AVD, by the way, is standing behind its product and has handled the problem in a totally satisfactory way.)

It's fixed now. I substantially reinforced the seat mounting points. 1/8th inch rubber fender washers now cushion the seat/mount interface so there is no longer a metal bracket pounding into my back. Pedal steer is nearly all gone, as the seat assembly has regained its rigidity. I can once again power down the hills. The tailbox is also much quieter. I guess there may be a final lesson here: reinforce those mounting points if you're not going to spend all your time on smooth roads. Regardless, don't forget the rubber washers.

The first tires on the bike were Stelvios, which were fast, but gave a harsh ride. I replaced them with S-Licks. They smoothed out the ride quite a bit with little apparent loss of speed. For mixed surfaces they may be *the*



Ready to Ride! (photo credit: S. Baker)

best all-around tire. Recently I tried Comp Pools up front, which added speed, a still smoother ride, and a more "planted" feeling to the mix. Unfortunately, they look like a draft horse collar on Seabiscuit, and restrict the turning circle due to their extra width. This trike demands the skinny tire look.

Fitting those Comp Pools with fenders was another challenge. There just isn't enough room for them under the stock fenders. Yet, fenders are a necessity. A weekend of riding past mulberry trees without them left my elbows stained from berries and scratched from flying gravel. Yes, the elbows are that close to the tires.

With the harsh ride problem behind me I've migrated back to Stelvios, which look far better and give good speed and handling. I suppose I'll eventually have to try Continentals, if only because they're factory fitted on ready to ride models.

In the rear is the surprise of the project, a Hutchinson Top Slick. I bought it on sale because its yellow trim matched the bike. It turned out to be light, fast, and durable, even while grinding on the tailbox on rough roads and trails. I may still fit a bit wider tire for rail trails, but the Top Slick is at 1,300 miles and still running fine.

As an everyday trike the Windcheetah is pretty versatile. The tailbox that gave such an aero boost on the downhills really does hold a lot of stuff. On the GITAP ride I had a rain suit, a helmet (which I do not like to wear), a few tools, tubes, a spare tire, a pump, a bottle of Gator Aid and a few miscellaneous small things. At home I've gotten 12 bottles of India Pale Ale from the store in there as well. AVD makes a rack and bag combination which is quieter and carries a lot, it just doesn't look as cool. So I use the rack and bag on rail trails and the box on the street, which works out pretty well.

The rest of the trike is practical as well if

you remember that character thing. You absolutely must check fittings regularly. The stiff frame allows a lot of vibration to reach nuts and bolts and they like to loosen. Loctite is your friend! If you're willing to accept your responsibilities and accommodate this Trike of Much Character you may find this to be the only recumbent you need.

Likes

- It's fast!
- It's comfortable!
- It's beautiful!
- It rewards good technique.
- It has Character!

Dislikes

- Carbon bits are too fragile.
- It requires lots of attention.
- Bump steer still needs watching.
- It demands good technique.
- Drum brakes

My experience with recumbents has involved trading bikes pretty often, as I seem to find the hunt more enjoyable than the actual possession. #K628 seems to have changed all of that. I think we'll be together for a long time.

Note: From Bob Dixon at Windcheetah, "*The Club Sport kit has officially been withdrawn from general sale. I might still be open to some arm twisting persuasion from genuine enthusiast. It's a great way to build yourself a custom Windcheetah, but it shouldn't be viewed as a cheap way to Windcheetah ownership, (unfortunately there is no such route) the kit was primarily aimed at the customer who wanted to build themselves something a bit special.*"

Info

Kit price: \$1,800; complete trikes from \$3,300.
Web: www.windcheetah.co.uk ♦



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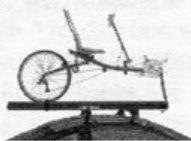
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Pippa's HPUV #1

PROJECT H . P . U . V . Human Powered Utility Vehicle

By Pippa Garner

miscpippa@mailstation.com

All I wanted was a good *HUMAN POWERED UTILITY VEHICLE* to alleviate auto dependence. I wasn't interested in a bike trailer, which creates an ungainly rig, or an inherently unstable trike (I've owned both). I wanted a rectangular four-wheel platform for safety and maximum space utilization, basic in design, but not crude, and pleasant to ride, not an industrial strength clunker.

I ended up building my own because I was unable to find any such existing product. After much trial and error, I produced a successful design, HPUV #1. The project could have ended right there, but the amazing stability and versatility of the quad layout prompted me to experiment further, yielding two more variations.

HPUV #1

Prototype SWB Quad Carryall

Steering: S&B single tie-rod

Seat: BikeE

Rear end: Tribi bike-to-trike conversion, (1-wheel drive)

Wheelbase: 39"

Weight: 75 lbs. (approx.). Production version 10 lbs. lighter

Gears: 18 speed

This vehicle is essentially a short wheelbase (SWB) recumbent (37-inch wheelbase) with a long wheelbase (LWB) riding position, a combination only possible with four wheels. The high seat/low bottom bracket (BB) set up is safe and intuitive, while the SWB allows an

ideal weight balance, compact overall size, a tight turning circle and, a stiff frame. I discovered that with four wheels, frame torsion creates a passive suspension effect. For example, if the left front wheel drops, the right side resists. To maximize this reaction, frame flex can be "tuned."

A couple of other quad advantages: Two wheel-tracks (trikes have three) make it easy to steer over obstacles, and you have a perim-

eter around you (a wheel at each corner), which provides some protection in traffic. (Twice I've been hit by cars and seriously injured while riding.) HPUV #1 performs surprisingly well. It's actually enjoyable to ride and the carrying capacity is about that of a small car trunk. As for weight bearing, it easily handles my 110 pound, 300 watt subwoofer sound system with 12 volt battery. The overall width is only 30 inches, which is narrow enough to be safe in traffic, yet still rock steady.

HPUV #2

Prototype LWB Quad Cruiser

Front end: Obscure bike-to-trike conversion, brand unknown.

Seat: Easy Racers Cobra

Steering: Double tie-rod

Rear end: Tribi (1-wheel drive)

Wheelbase: 57"

Weight: 70 lbs. (approx.). Production version 5-10 lbs. lighter

Gears: 18 speed

The concept here is a "quad kit"; front and rear complete assemblies that could be attached to an existing frame. For simplicity, it uses standard forks, brakes and headset. Full-size wheels smooth the ride and raise the seat even further (29 inches) for added visibility. The width is 30 inches.

HPUV #3

Prototype Affordable Quad-Rod

Front end: WizWheels

Seat: WizWheelz

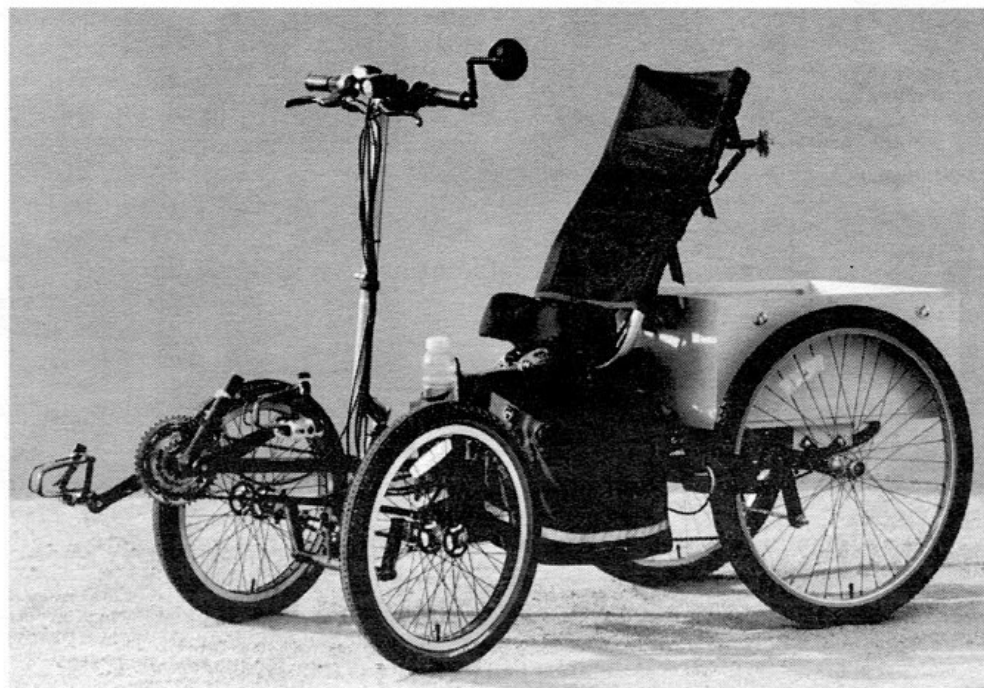
Steering: Ackerman

Rear end: Tribi with canted wheels (1-wheel drive)

Wheelbase: 39"

Weight: 45 lbs. (approx.)

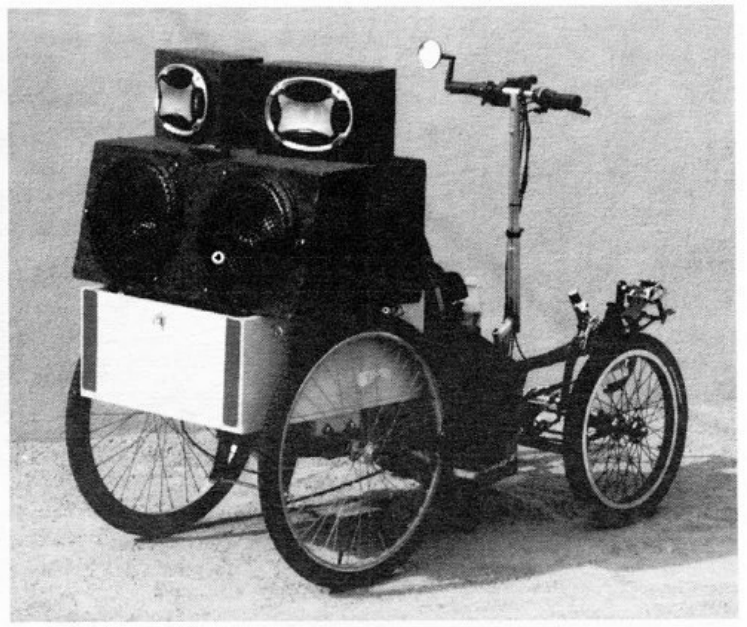
Gears: 18 speed:



Pippa's HPUV #1



HPUV #3 Dancing from side to side



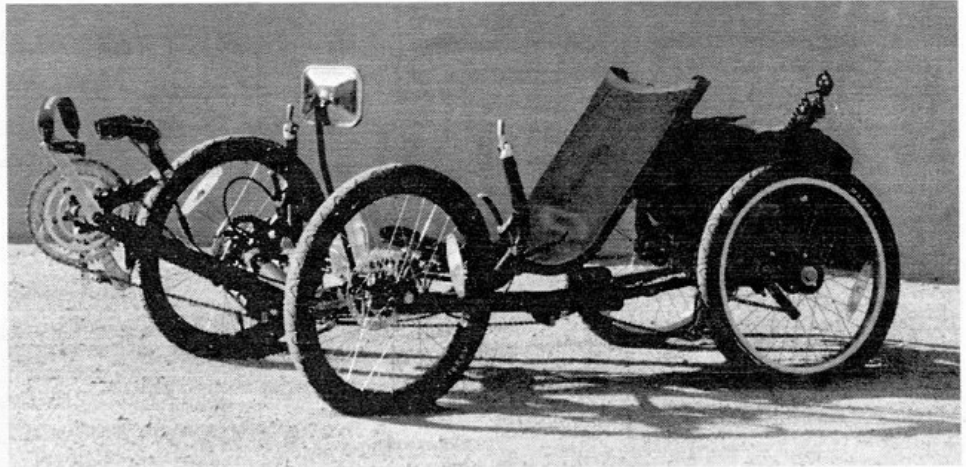
HPUV #1 with 110 pound 300 watt, 12-volt stereo

I added this as a "Halo" Vehicle (auto industry term for a specialty car that highlights a division, like the Corvette). It's a production trike which I converted to four wheels. The result is a sexy, performance machine that handles like a go-Kart. Everyone wants to try it and comes back with a big grin. But other than as a thrill ride, it has limited usefulness: too low and wide to be safe on public roads. Note, however, another four-wheel advantage: low, unobstructed carrying space between the rear wheels. As a part-two evolution, I'm going to raise the seat enough to allow a straight chainline, and narrow the front width to my standard 30 inches. I'm sure it will still be very stable, and much safer.

1-Wheel Drive or 2-Wheel Drive

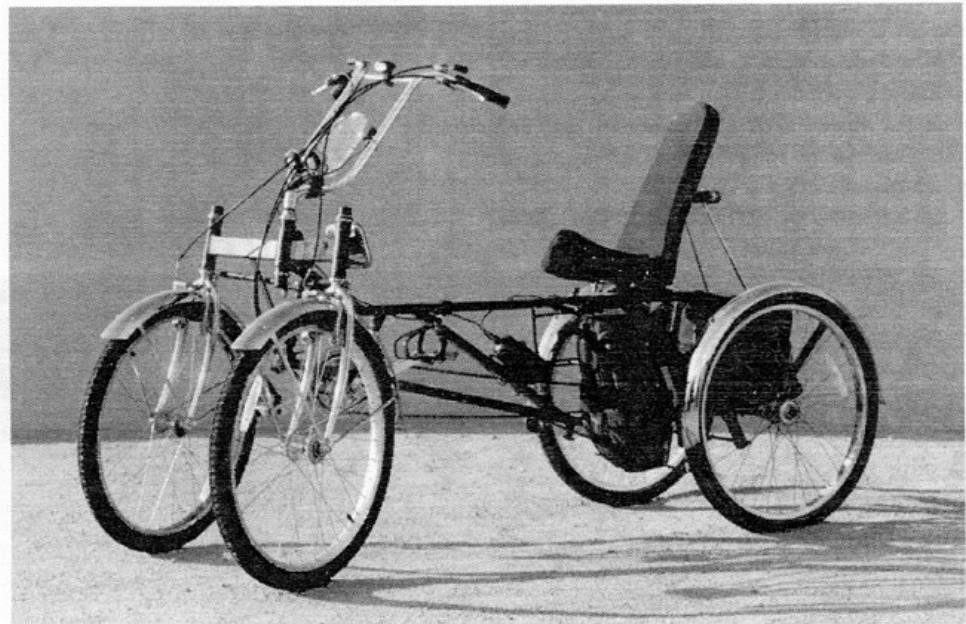
One- vs. two-wheel drive: This is a non-issue with bicycles and tadpole trikes because the drivetrain is symmetrical, but with two rear wheels it becomes an important variable. For expediency, I built the HPVs shown here with one-wheel drive and, for many uses, this is adequate. But I have another industrial-strength four-wheel truck, "Quadzilla," which has two-wheel drive, and the difference is remarkable. This machine, a juxtaposition of Rhoades Car, mountain bike, and huge cargo box has the traction of a mountain goat. The Rhoades system is unsophisticated but works perfectly: A live axle with a freewheel in each hub. Of course, this precludes the use of canted wheels but, in my experience, that's no loss; they cause the spokes to loosen up.

So that's my humble contribution towards the betterment of recumbent quads. I eagerly await the day when contraptions like these rule the road, and money grows on trees, etc. ♦



Above: HPUV #3 is based on a WizWheelz trike with an Tribi trike conversion rearend from Cambie Cycles in Canada

Below: HPUV #2: Affordable Quad-Rod



Pippa Garner lives in Santa Fe, New Mexico and is a car-free artist/inventor/futurist/ reality-hacker, veteran media-rat, and regular contributor to Car and Driver Magazine.



Lightfoot's MicroCar Standard

PROJECT H . P . U . V . The Lightfoot MicroCar

A side-by-side "sociable" two-seater. The MicroCar is designed to reliably, efficiently and safely transport two people for recreation, shopping or shuttling children. It's built to be efficient, without sacrificing strength, durability or ease of use. With its 42" total width, the standard MicroCar is meant to be used on quiet streets or wide bike paths; it may not fit well on narrow paths or very constricted shoulders. Optional electric assist motors are available; these are reliable and efficient hub motors.

The standard MicroCar version has 26" rear wheels, which provide a smoother ride and better traction on rougher roads. A cargo hammock is standard.

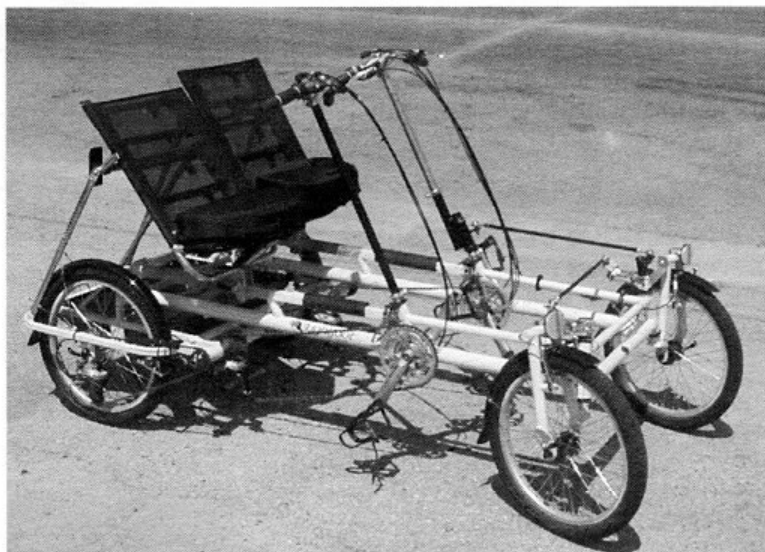
On a custom basis, the standard can also be outfitted with a built-in lidded Half Box, 18" x 28" by 14" deep. As well, a variety of tote boxes available on the market, including the Rubbermaid Action Packer™, can be fitted.

Compact MicroCar

The compact MicroCar is the same width as the other versions, but has a shorter 59" (5 feet) wheelbase, and will fit on a receiver hitch rack behind almost any car, van or RV. It's our smallest 2-seater, and is the most compact to store and transport. With its 20" wheels, it's meant for smooth streets and bike trails. The Compact will accept electric assist.

The Cargo MicroCar version has a full 28"

The Lightfoot Compact 4x20" wheel MicroCar



Standard 2x26 + 2x20 MicroCar with trunk



x 28" Utility Box (like the Lightfoot Transporter), with wide platform fenders; this raises its price over the other two versions and adds to the length and weight. The Cargo version can be outfitted with a custom bench seat for children.

There is also a TerraTruck model with a single seat and four wheels. The TerraTruck is 42" wide (same as the MicroCar), with a shorter 63" wheelbase and 7' 4" overall length.

MicroCar Info

The turning radius of the four-wheeler is much larger than that of our delta trikes. The MicroCar comes standard with high-performance, high-pressure tires and alloy-rim wheels. The non-cargo versions will cruise on level terrain at speeds approximately 75-80% as fast as a bike. The MicroCar features very powerful all-wheel braking using V-brakes. The Lightfoot Cycles' MicroCar is designed and built to be safe, easy to operate, quick, stable at speed, usable by a single person, very durable and highly useful.

The MicroCar has very wide range gearing. Gears are shifted just like a 24-speed mountain bike. A separate shifter allows you also to choose 8 ranges from super-low to high. Powerful V-brakes and all-wheel braking is standard.

The MicroCar does not have suspension,



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and should be ridden in a way that minimizes hard bumps and situations that strongly twist the frame when heavily loaded. Slow speed in rough conditions can help reduce stress to the frame and wheels. Versions with the 26" rear wheels and 2" tires are much smoother on rough terrain, gravel and broken pavement.

The Compact version with 20" rear wheels is not recommended for other than slow or moderate speeds on smooth pavement. Steering this unsuspended four-wheeler is not as effortless as steering our trikes. Center-point steering design helps reduce, but cannot eliminate, the effect of the rough road surfaces. Tire stle and pressure will affect steering.

The MicroCar is designed to be rideable by one person, but is less stable on sharp right-hand turns if the single driver's weight is not counterbalanced by a load on the right; therefore, care should be used by the solo rider when cornering to the right.

The power-transfer jack-shafts are 3/4" 4130 CroMo steel, with threaded mounting for standard freewheels. Jack shaft bearings are sealed flange bearings; easily removed and replaced if necessary, with no need for special tools. MicroCars have CroMo frames, 24 gears x 8 compound gears with a range of 10-120 gear inches. Components are Shimano Deore/LX. The weight is 105 pounds and a rider weight capacity of 500 pounds, and a cargo capacity of 100 pounds (standard model).

New for 2004 will be optional Pantour suspension hubs.

MicroCars start at \$4,700.

For more information, visit www.lightfootcycles.com. ♦

Source: Lightfoot Cycles

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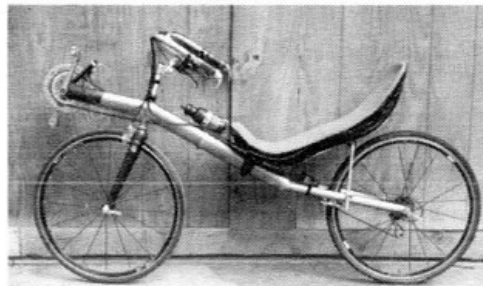
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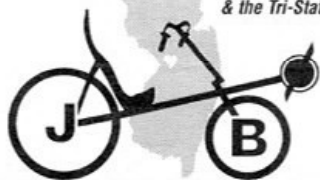


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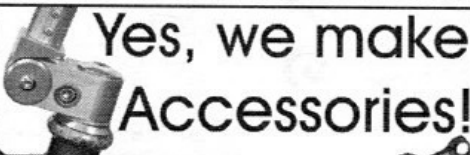
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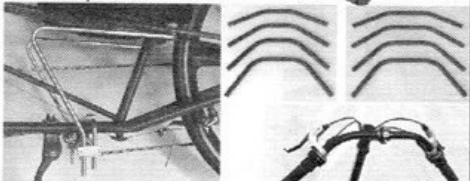
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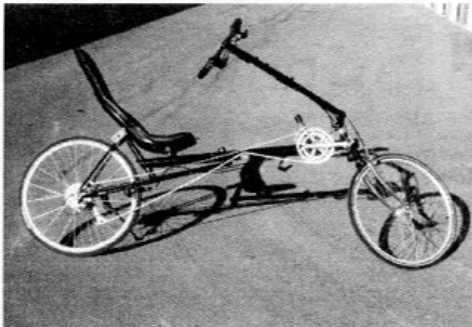
My wife and I purchased SCOR Kneesavers and are totally pleased with them. She's 81 and rides her Thebis trike almost every day. I ride an HP Velo Spirit, purchased after reading about it in RCN. At first I was disappointed because it was so sluggish in comparison to my beloved Easy Racers Tour Easy EX. It's now quick and lively because I changed to Primo Comet 100 psi tires. With this upgrade, the bike is worthy of the strong RCN endorsement (RCN 075).

Frank L Crump

Editor Comments — The HP Velo Spirit remains the finest CLWB recumbent we've ever reviewed. When Fall rolled around, we really missed this versatile city 'bent.

Turner Dual 26 LWB

The Turner recumbent today is not the same bike that you reviewed several years ago. The reason I'm writing you is that I just saw and rode his new dual 26" wheeled LWB today. I am really impressed. Milt Turner has made some changes. I've owned a Stratus and ridden the Tour Easy and RANS V2. This new bike is better than any LWB I've ridden. It has no wheel flop and was easy to start and stable



Milt Turner's dual 26 LWB OSS
(www.turnerrecumbents.com)

at all speeds. It's very sleek and sexy looking. He still has some minor tweaking to do to it, but when finished will be major compe-

tion for every other LWB. I haven't been this excited about a recumbent for a long time.

I like Milt's product and feel the word needs to get out. I think you'll be impressed and pleasantly surprised by his dual 26 LWB. I hope you get a chance to review it.

Harvey Stackpole
Tucson, AZ

Editor Comments — We hope Milt will send one up for us to review. Or maybe I'll get on a plane and drop by Tucson and ride with you guys some winter day. ♦

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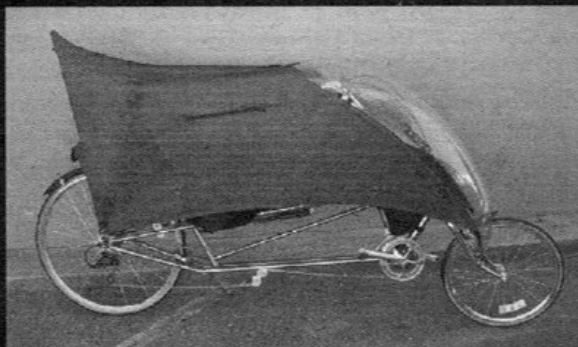
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