

RCN

RECUMBENT CYCLIST NEWS

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INTERVIEWS
**VISION
DESIGNER
JOEL SMITH**

**RCN
ROAD
TEST
Vision
R32
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**PLUS
JIM LANGLEY
TESTS THE
LIGHTNING R84**

AND PART 1 OF
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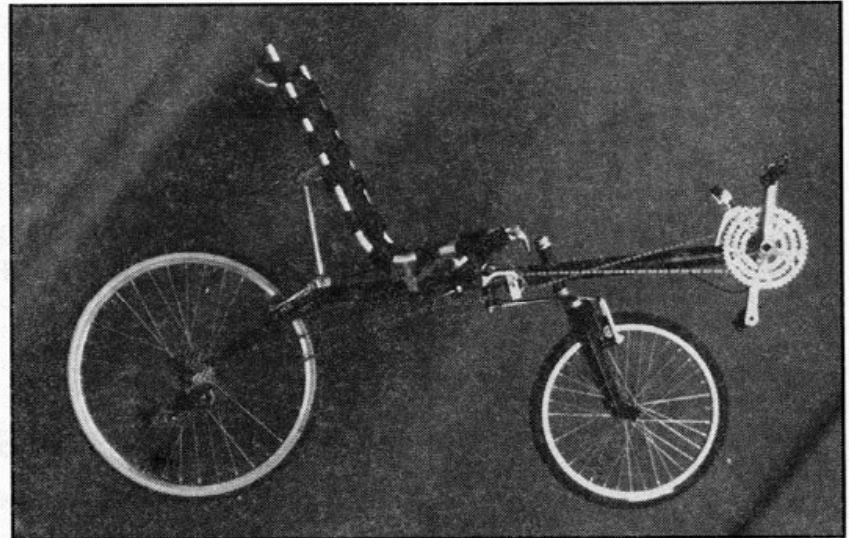
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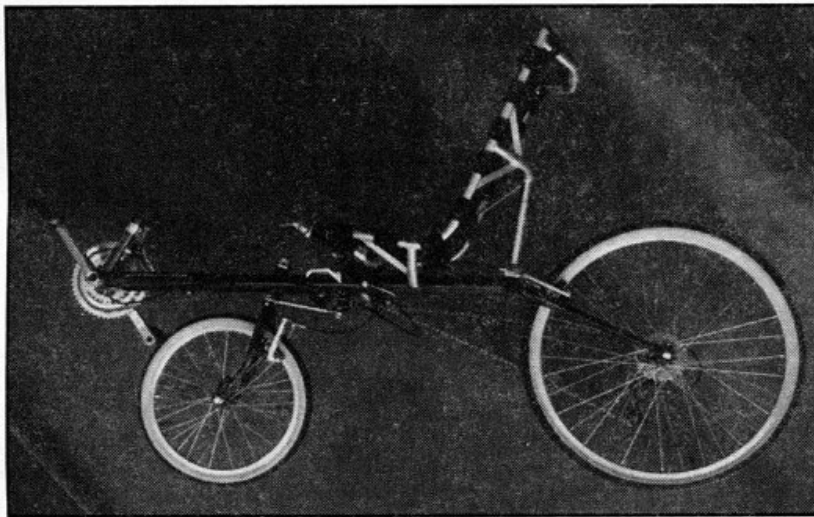
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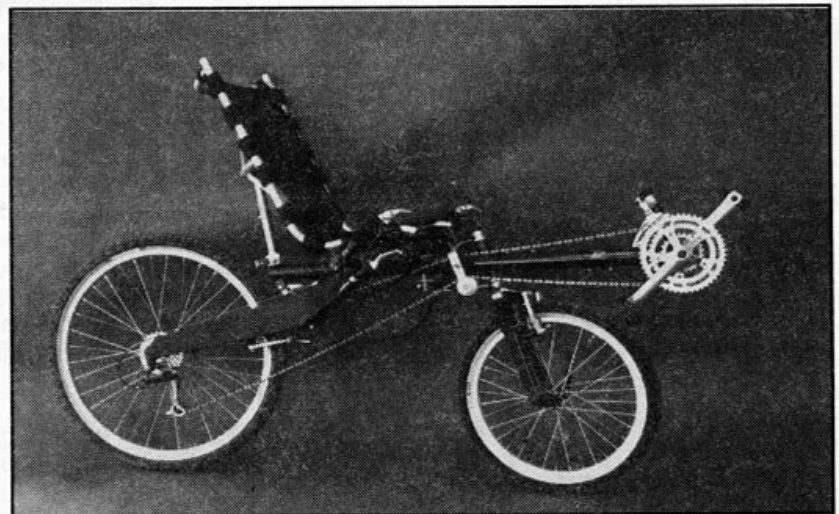
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 make every effort to provide useful
 and accurate information, we do not
 claim to have definitive answers—
 particularly with regard to safety,
 technique and equipment.

What We Don't Do

Due to our minimal staff, we do not:
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R E C U M B E N T C Y C L I S T N E W S

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RCN Notes

✓ **CALLING ALL SPYS**—If you hear a recumbent rumor, see a prototype, or anything that you think RCN would be interested in—PLEASE send leave us a message at Tel. 253-630-7200 or DrRecumbnt@aol.com. Please DO NOT assume that we've heard about it already. Thanks!

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Fine Print: RCN is published by Bob and Marilyn Bryant & family in Kent, Washington. We are a two-person company. We publish from our home office. We have no employees, only dedicated volunteers and friends who work cheap. We are as far from a corporate affair as you can possibly imagine. This magazine is published by enthusiasts, for enthusiasts—because we love recumbent bicycles. We are the voice for the enthusiast recumbent world since 1990.

If you are upset that we are difficult to get ahold of on the phone, drop us an email or send us an SASE with your question and that almost guarantees you a response.

The Difference

Does Bob really know best?

by Robert J. Bryant, DrRecumbnt@aol.com



Some say Bob likes two wheelers better.....

I don't profess to have all of the answers about recumbent bicycles. The fact remains that I have made it my life's mission to try and explain all about recumbent bikes to RCN readers to the best of my abilities. I would say that, for the most part, my calls are pretty close to how you as readers feel—otherwise I'd hear all about it more often, and RCN would not have survived for 50 issues and nearly 10 years. Even if I'm not right, I believe that RCN offers enough information and insight for readers to filter it through their own ideals and standards, thus making educated decisions.

Let's face it, everyone of us who's been around recumbent bikes for a few years, develops their own standards and criteria for what works best for themselves. I'm not going to lie to you and tell you that I ride a "compact" daily, or that my favorite bike is a SWB USS, because it's not. All I can do is ride the bike and tell you what I think. What you get is my editorial opinion—nothing more.

Some aspects of recumbent design are very much fact-based and comparable: weight, fabrication quality, component spec and warranty. Other design aspects that are totally the editorial opinion of the reviewer are: comfort, design, and ergonomics (seat recline angle, BB height). Is this a problem, NO! This is wonderful news! It makes the *difference*.

■ THE BEST FOR WHOM?

RCN "awards" and "bests" must be taken in context. I look for supreme value, proven design, availability from a reliable manufacturer and a bike that really does something for me, (or for you). As Rolf Garthus of the Hostel Shoppe recently explained to me, "There really is no one single BEST for everyone." It took a few hours' worth of email exchanges for me to get the point. But I got it.

Let's analyze a bike that I *REALLY* like, the Rans Vivo. This bike has a long wheelbase (for a SWB), the blissfully comfy Rans seat and Flip It above seat steering (ASS). It is a dream on wheels for tall riders. It may be less than ideal if you are 5'2" (as are most 20" front wheeled SWB). In fact, it may even be a bad choice.

The other item that I neglected to discuss is my preference for above seat steering. There was a time when I loved under seat steering. Gene Lemle built me a custom Tailwind LWB USS back in 1990. I loved that bike. I've ridden many since, and found that with my XL body and broad shoulders, there is definitely a USS performance penalty. Though, if you are 5'9" and #140, it may be the best thing since sliced bread.

I don't even flinch if the latest, greatest SWB test bike weighs 28, 30 or 32 pounds—who cares. If I weighed #140, I'd care! Sometimes I wish that I would have been graced with a svelte athletic #150 pound body so I could take advantage of some of these really light recumbents that some manufacturers build. For somebody who is lightweight, a lightweight bike makes a lot of sense and paying a premium for one may be money well spent.

■ WHAT WORKS BEST

One thing I can do is to outline my opinion of what bikes work best for what riders. We're mainly talking heights and weights here. I am trying *VERY* hard to understand how bikes work for other riders and plan to try and be more in touch with this in the future. An example of this may be found in the discussions of the comfortable Rans seat. Yeah, it's a great seat—and comfy. A negative comment I recently heard about this new seat was, "the fat guys won." I didn't really get it at first, and then I noticed that the new Taiwan Rans seat is both taller and appears to have a larger base than ever before. A skinny rider wouldn't require a seat

anywhere near that wide, and the seat is tall for even me. And I am aware of many small and medium size riders who much prefer the laid back comfort of the Vision seat. I feel pretty comfy on a Vision seat, too, but I think it works even better for a more "average" size rider. I hear from people all the time who love their BikeE CT seats (low back). Ron Schmid is still spoiled by his Counterpoint Presto seat. Mark Colliton still has a cut-down Rans "bucket" that he brings out once in a while for his original V-Rex. Yet others love *HARD* shell fiberglass seats with minimal padding and adjustment (I miss the point on these, sorry).

■ BOUGHT AND PAID FOR?

I guess that I can be a pretty good scapegoat. Some seem to have this fantasy that my editorial is bought and paid for. The truth of the matter is that I am not that difficult to please. All I ask for is simple. A brand new loaner test bike, in the box or delivered set up to RCN. We ask that manufacturers pay for round trip shipping, but the truth is sometimes I forget to bill them (and I'm not given test bikes). I am not given the bikes and I am not paid to road test them. The part that makes RCN look bad is that some of those complaining don't have road tests in RCN because they don't send test bikes. The biggest road test secret may be in that phone call that I get (or don't get) from the designer as he explains what he has tried to accomplish with his new model.

It is a pretty straightforward scenario. I need to have a good experience to write a good test. Expect criticisms, as no bike is perfect and our industry is always changing, bikes evolve, as does the market. So, when somebody tells me that I'm bought and paid for, I have to laugh to myself. I need to sleep at night, and when you write as much as I do, you could really get caught up in the lies and BS. So, I just tell the truth. My pal Ron Schmid calls it the RCN 99% truth policy.

I can be wrong, I've made mistakes, and sometimes I've had a difficult time emulating a small or medium size rider (though I do try). The truth is that I really want to learn about each new bike—and report back to you. "Bought and paid for" is the biggest insult a writer can hear and I just would not do it. A bit of advice: If your mission is the almighty dollar, pick a different business than bicycles.

If you still don't like what I've written, send a letter to the editor or write your own damn article for submission. If you're not willing to do this, don't shoot me, I'm just the RCN publisher. Retirement for me will be more voices (road testers) and differing opinions in RCN.

■ THE BIKES OF RCN

So which is *REALLY* and *TRULY* the *BEST*? Well, I was spinning through the latest RCN the other day, and saw ads for the following companies: Vision, Haluzak, BikeE, S & B, Lightning, Angletech, Zach Kaplan, Brompton, Organic Engines/Fools Crow, Longbikes, Rans, Cambie, Earth Cycles, Human Powered Machines, ICE (Trice), Bike Friday/Greengear, Greenspeed, Reynolds, and Easy Racers. And here are the facts about which is *BEST*:

None of the above are *PERFECT* for every reader/rider.

All of the above have a place, and are a *BEST* for somebody. I have loads of respect for every builder who places his/her products in front of the critical eye of the world's recumbent enthusiasts for us to pick and choose which is the *BEST* for each one of us.

With this revelation, I hope to write from the perspective of *WHOM* a given recumbent just may be *BEST* for, and find some other voices as well. The vast differences in design are what make recumbents so special. The builders and designers of today will be looked at as the pioneers of our industry and I'm proud to know all of them. □

Recumbent News

July—August 1999 RCN#52

Thousands of Cyclists to Take the Road to DC in 2000

Many thousands of cyclists will be headed for Washington, DC in the summer of 2000 from the west coast, the east coast and various points throughout the nation to rally for safer cycling roads and a nationwide network of bicycle Greenways. Inspired by author, coma survivor and TransAmerica veteran cyclist Martin Krieg, this movement already boasts nearly 500 sign ups from the group's web page, www.Bikeroute.com. They expect this number to grow exponentially over this next year as they bring this effort off of the Internet and into mainstream America.

One of the ways that they expect to do that is with their Advance Scout Andy Parker, who will be leaving Sarasota, Florida for a round trip tour of the US. Leaving for California on May 1, his bike, the body stocking that covers it, his flag and the bike's windscreen will all promote this group's web site.

Once there, one can find maps that interact with databases to also show cyclists where to eat, sleep and play in the various areas it takes them through. There is even a print-quality poster for the ride that one can download as well as an on-line store which sells items that promote their Grand Ride. An interactive mailing list any one can join helps them set policy and determine what needs to be done next. Even public library users can take part in this effort as Bikeroute.com also shows them how to easily and readily get a free email address of their own.

Already Congressmen Sam Farr and Earl Blumenauer (the principal alternative transportation bill, TEA 21, authors) have put their staffs on alert to assist this group's cause in any way their resources allow. They also plan to ride a small portion of this epic coast-to-coast TransAm as it comes through their respective areas.

The August 20, 00 party that will stand as a grand finale to showcase their efforts at the nation's capitol is being orchestrated by a retired Colonel. Armed with a wealth of insider contacts in DC, he foresees an outdoor fair with musicians and entertainers and a mass ride led by politicians and other dignitaries.

For further information, contact Cycle America: cycleam@bikeroute.com. □

RCN Signs Canadian Distributor

Effective immediately RCN Canadian Subscription sales and distribution will be taken over by Cambie Cycles in Vancouver, Canada. ALL Canadian issues will be shipped to Cambie and mailed to points across Canada. This should speed the distribution process, allow easier ordering and distribution throughout Canada, and hopefully increase circulation in Canada.

Cambie Cycles is a well respected recumbent bicycle shop and recumbent frame builder in Vancouver, British Columbia and was our FIRST CHOICE for an RCN distributor. They are one of the oldest recumbent shops in North America and we have always had excellent relations with Bob, Brock and the Cambie Crew. They build very nice custom bicycles as well.

Cambie Cycles
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RCN will maintain an existing Canadian database until all of the subscriptions have been renewed through Cambie. Existing subscriptions will continue uninterrupted. If you ordered your sub through RCN, send address corrections to RCN.

RCN Goes First Class

Due to irregular mailing service, we are *NO LONGER* accepting standard/3rd class mail RCN subscription orders. You can upgrade your subscription for \$1 per outstanding issue. We plan to ship a few more issues 3rd class. After which, all outstanding subscriptions will be converted to first class. Long term renewal dates past RCN#58 may be affected (long subs). If you have a concern with this, please let us know. This is not a profit making venture, but a way for us to improve your RCN service. DrRecumbnt@aol.com □

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After you subscribe to RCN, the top line of your mailing label will read as follows: “__ LAST ISSUE” In the blank will be a number, such as “60 LAST ISSUE.” Which indicates that RCN#60 is the last issue of the subscription that you paid for.

RENEWALS

We will only send you *ONE* renewal notice with the issue prior to your subscription being expired. If your mailing label says, “60 LAST ISSUE,” you will receive your ONE renewal notice with RCN#59. □

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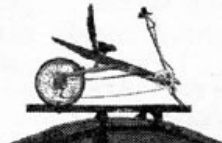
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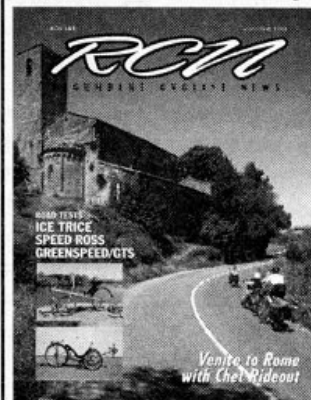
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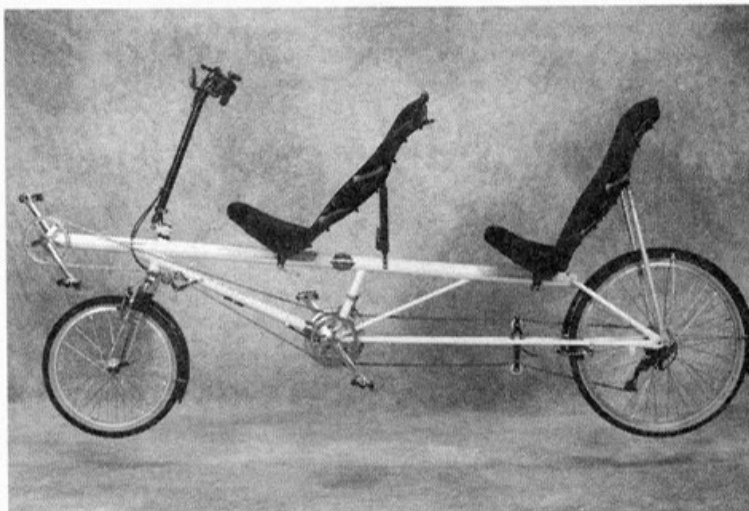
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A New Screamer



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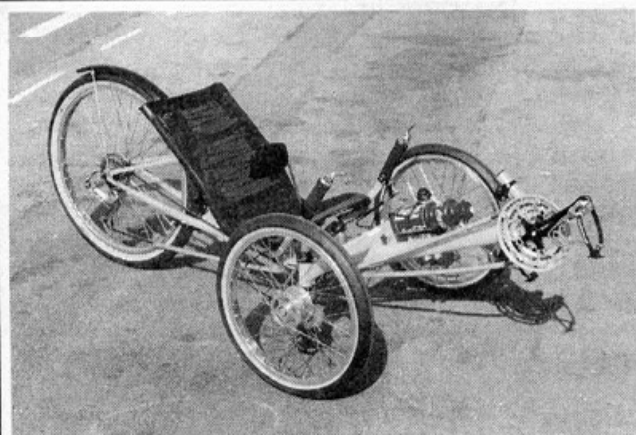


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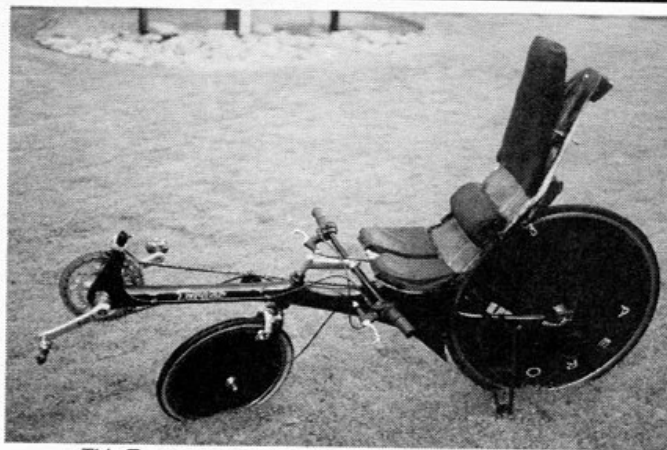
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Recumbent Rumors

ANGLETECH MC² SWB SPY REPORT: You DID not hear this from me! This afternoon I got a chance to ride the brand new MCSquared at some little shop up in the mountains of Colorado. A SWB ASS bike weighing 26 pounds. Lightweight aero frame set, Rans seat back with a mesh base, 20X26 wheels. Initial impression of the bike, fast little bike, very lively feel, very responsive to power input, tracks great at speed and climbs well—anonymous. **Earth Cycles** has an unofficial Dragonflyer web site is: <http://www.pubrats.com/~rohn/trike/>. **Ron Schmid found a cool web site that tests seven Trikes** from Australia <http://sunsite.anu.edu.au/community/ozhpv/7trikes.htm>. **TURNER UPDATE:** T-Lite owner Bob "LaidBack and Lovin It!" Miller sent us an email that said Milt Turner (who is still mad at RCN) is now manufacturing a graphite bike complete with front and rear carbon graphite fairings. Milt is selling them as frame kits for \$2700. The fairings he is selling as a kit and they will be selling for \$500. If any of you get in line for a \$2700 Turner frame—I want to know about it! **RECUMBENT COMPANY FOR SALE:** Lemle Lightning Cycles of Ohio, LWB USS 20 rental bikes, frame and seat building fixtures, all equipment to build, and would include frame building training. Lemle's are known as a well built quality bicycle with an outstanding reputation. Asking price \$15,000 Tel. 419-826-4056. **3x8, 3x9...** The SRAM rumors persist, but while we wait for an update to the venerable Sachs 3x7, Zach Kaplan sells an easy to install adapter kit. **TIME TO BUILD CARBON BMX FORK:** TIME has been so successful with its carbon road forks, that company officials have decided to produce a BMX fork. The 20" forks feature a monobloc carbon-fiber crown with an aluminum insert similar to Time's Equipe Pro road fork. The 850-gram (1.8 pound) forks have a steel steerer tube. The fork will retail for about \$225. **MANUFACTURERS & DEALERS,** remember Joe Sandshulte from J & B. He is "back with a vengeance" and is the new recumbent-connection at Seattle Bike Supply. **CANNONDALE RECUMBENTS?:** We've heard rumors of Cannondale



This Turner spy photo came in an unmarked envelope

reps showing up at recumbent bike shops and asking lots of questions, and actively looking for dealers. We've heard this from two different parts of the country. The bikes are rumored to be 2000 models: a slick 24-speed aluminum Compact "city recumbent", a fully suspended aluminum SWB and an aluminum/composite LWB ASS. These surely won't be low end recumbents and from what we know, it is sure to shake up the recumbent world. Hopefully they won't have the same lame attitude of another big manufacturer we know. ☐



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1999 EVENTS CALENDAR

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▲ HPR North American Championship & deciMach

August 7 & 8, Sparta Wisconsin
Contact: garriehill@nextek.net
or www.recumbents.com

▲ World HPV Championships

August 14-22, 1999, Interlaken, Switzerland
Contact: Future Bike CH, Spitzackerstrasse 9, CH-4410 Liestal, Switzerland Email info@futurebike.ch, or on the web: www.futurebike.ch

▲ 2nd Annual The Great Family Bike Ride

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500 unsupported miles in 10 days. Possible bike/equipment loan/rent/buy. Shel_bikewalla@yahoo.com

▲ Mt. Airy BentEvent & TanDemo

August 29, 1999, Mt Airy, MD
Contact Larry Black Tel. 301-831-5151

▲ The Main Event Round 6 (People Movers Rally)

Saturday September 4, 1999
Contact: People Movers tel. 714-633-3663 or www.recumbents.com

▲ HPV Races Schedule

Check www.recumbents.com/wisil/events.htm, or www.ihpva.org

RECURBENT RACES IN WISCONSIN!

On August 7th, one hour road race for faired classes, road race for unfaired classes and recumbent drag races. On August 8th, the 200 meter sprints and 2nd annual .deciMach at Sparta Airport—flat, straight and legally downhill! Prizes will be worth \$12,000. Annual top speed prizes of \$1,000, \$500 and \$250 for the three top speeds at the .deciMach.

\$35 registration gets you two days of racing.
Contact: garriehill@nextek.net or www.recumbents.com

CABDA—The Midwest Bike Show

by Ron Schmid

nullian@pacifier.com

I'll be the first to admit it, I'm a bike show junkie! When the weather is bad and we have had it here in Portland Oregon with 93 straight days of rain an enthusiast like myself has to do something to feed his habit. It started at the "Greater Seattle Bicycle Show" in February this year. I got to meet Gabe Vest, salesman from BikeE and hang out with Dale Clark from Angle Lake Cycle who was showing the Rans and BikeE '99 lines. The Vision crew had their 99 line, including the new R32 MWB there. Green Gear/Bike Friday showed the production version of their folding recumbent Sat R Day, which looked much better than the one I saw last fall. For the electric vehicle crowd the Swiss designed, Seattle built Twike was on display.

My idea of attending the Chicago show was sort a spur of the moment thing. I have heard a lot about the show for many years and knew that Angle Tech was showing the newly designed Mark Colliton SWB recumbent, "MC2" for the first time. Working for an airline gives me some good benefits like a round trip fare to Chicago for \$25. I thought it was going to be an easy trip. Leaving after work on Friday afternoon, I had planned to take a flight to Minneapolis with a connection to Chicago arriving about midnight. Well the first leg of the flight went okay, but Mother Nature had other plans. It had been snowing for hours in Chicago and all the connecting flights had been canceled for the evening. Traveling standby makes one used to this type of inconvenience and you just try another day. The next morning wasn't much better so it was off to the Mall of America, much better than sitting in the airport for shopping and sightseeing. I would recommend it to anyone who has to spend some time in that town. The afternoon flights were looking better, so I'm off again to the airport to try once more. I caught the 1pm flight, which was leaving at 3pm for a 55 minute flight that took three hours while we circled for a spot to land. You just have to laugh and think that it couldn't get much worst—though I was determined to get to CABDA.

I finally arrived at the show by 6pm. Luckily for me, the show is near the airport. Unfortunately, the show closed for the evening at 7pm. I had just enough time to surprise Kelvin Clark of Angle Tech. I handed out some sample copies of RCN and met some of the Chicago Recumbent riders. The next day was much better, I awoke to a beautiful Chicago snowstorm. I had a leisurely breakfast with Kelvin from Angle Tech—and then was off to the show before the crowds arrived.

The show seemed smaller and less well attended than I had heard. Maybe it was the weather? Trek had a booth—but no sign of their recumbent. Mavic showed their new Mktronic electronic rear derailleur system with optional handlebar shifting buttons that would work great on recumbents for the non-retro crowd though. I stopped at the *Bicycling Magazine* booth and told them that I was going to downsize (not renew my subscription) them after their recent downsizing.

I met a very interesting recumbent inventor/builder named Wayne Soohoo who had three trikes in the test area. He calls them "Aileron Trikes" like a combination between a bike/recumbent and a tricycle. You ride it like a regular recumbent trike with a ASS but are able to lean into the corners. I have never ridden anything quite like it. It puts a big smile on your face and I would love to take it out on the open road sometime. He has been working on his design for a number of years now. My favorite one was the tadpole recumbent trike model. I think this one has potential with some refinement.

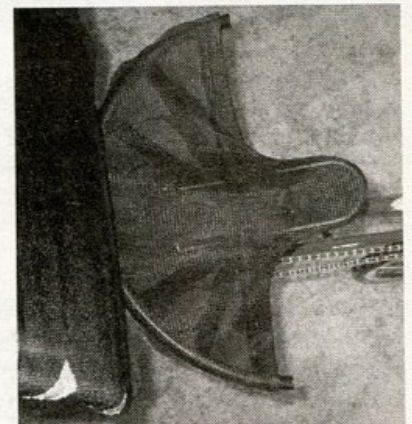
I spent the rest of the show talking to some of the Chicago Recumbent group like Len Brunkalla past president of IHPVA and Ed Gin, star of the famous Coroplast fairing video. Trek was present, though apparently keeping the R200 SWB under wraps. The reps were somewhat oblivious or they just didn't care.

It was a great trip and worth the effort. I had a chance to hang with the midwest crowd and check out some neat new recumbent bikes. □



A clean shaven Kelvin Clark unveiled the MC2 SWB at CABDA—Ron Schmid

Check out the sling/mesh base on this Rans seat back for the MC2. Base arc and nose are tubular CroMo with mesh.
—Ron Schmid



Neither rain, nor sleet, nor a few feet of midwest snow will stop our intrepid bike show reporter Ron Schmid (who is already planning for Las Vegas '99)—Thanks Ron



A unique lean/steer trike prototype by shown by Wayne Soohoo (WSOOHOO@aol.com) at CABDA Photo courtesy of Ron Schmid

MWB Revival—The Vision R32

by Robert J. Bryant

DrRecumbnt@aol.com

The new Vision R32 is a unique design departure for ATP. Best known for SWB USS recumbents, the design team at Vision has come up with a new departure in the medium wheelbase (MWB) R32. The R32 is an entirely different bicycle than the previous R30 "Metro" and the most important new design that we have seen in a while.

The key to the importance of this true medium wheelbase (MWB) is in the excellent weight distribution (about 65/35, with a range of 30-40% on the front wheel) and road-bike-like steering geometry—which results in better handling qualities than a LWB with the handling finesse of a SWB—without all of the trade-offs of the SWB. There is no boom and buzz-saw chainring sticking out over the front wheel and no heel interference with the front wheel. You can actually see your front wheel and the bike folds and stows nicely. This is nearly a perfect package—though maybe not a perfect package for everyBODY.

■ Frame & Build

The R32 has a TIG welded 1.75" diameter 4130 CroMo frame and fork. The tubes are cut, the frame is welded and powdercoated in the Vision factory in downtown Seattle, Washington. We had criticized the Vision weld quality on our recent R40 and the R32 is a definite improvement. The R32 is available with rear suspension utilizing a Cane Creek AD5 air shock or full suspension using the optional Ballistic suspension fork. New for '99 are roller bearing suspension swing-arm pivots as well as a stiffer CroMo swing arm. The suspension on the R32 works better than any Vision we've tried to date. The key to their success is in the MWB weight distribution. The 16" Ballistic suspension fork works great and was a pleasure over my bumpy test course—though it is a rather minimal travel fork.

This Vision model comes in above seat steering only. The R32 has a completely new ASS steering stem, bar and riser. The riser is a beefy and stiff CroMo piece with an Aheadset stem on top. This isn't pretty, but is very functional. The stem telescope adjusts about an inch—unfortunately, not very effective. The ASS stem riser has an adjustment range of several inches.

■ Comfort/Ergonomics

The R32 seat is one item that did come over from the R30 Metro. It has a CroMo frame that slides on a seat track—so there are no boom, boom bolts or chain adjustments necessary for rider adjustment (I love this!). This seat slider works wonderfully. Flip two quick releases and slide it to infinite and quick adjustment perfection. The R32 seat has no recline adjustment—though could use one.

The seat is comfy and works pretty well. The seat shape is very close to the SWB, with the foam base pad insert that covers the seat horn. The primary differences are that the R32 seat is more upright than the old R30 (10 degrees) and especially the SWB and LWB Visions. This combined with a higher bottom bracket makes for a very closed and rather advanced riding position. An odd twist, a "closed" riding position on one of the most user-friendly bikes around.

The Vision seat offers excellent comfort on all models. There are many loyal fans of this seat. The only complaint we hear about it is that our ratings of the seat are not high enough. Larger riders will feel the underside framework of the base more so than lighter riders. We wish that Vision would offer a higher quality piece of foam. The Thermarest air cushion is optional. We have not tested one in years and it was not designed for the bike, but is an aftermarket product.

■ Drivetrain/Chain Management

The R-32 has a smooth-working solid drivetrain. The Sachs twist grips easily shift the rear derailleur and 3x7 hub. The KMC chain rolls over

one sprung idler for a very free-flowing drivetrain. Each gear shift was precise though with the heavy weight of our test bike and the friction loss of the 3x7 hub, the bike could have used a lower low-gear. The noisiest aspect of our test bike was the unique optional Vision lexan chainguard/shield. Every once in a while, the chain shock from the shifting of the rear derailleur would "ping" the chain into the shield. In saying this, I was quite surprised at how well the chain shield works. Overall it seemed quieter than a chain tube.

■ Wheels & Brakes

Vision's alliance with Shimano has made V-brakes on Visions expected. The STX-RC linear pull V-brakes work better than on any Vision SWB. We experienced no rear wheel lockup like we found on the '99 R40. Full-on braking power is possible and you'll stop on a dime. This is due to the improved weight distribution of the MWB. We did notice some odd brake features. The front V-brake noodle clearance is very close. With their no-dish rear wheel and asymmetrical frame design, the rear brakes are somewhat out of kilter. Look closely and you will see one pad stud slightly go up, the other down—though they work just fine.

The wheel sizes are ideal on the R32. The rear is the tried, true and beloved 406mm 20" and the front is the "Vision size" 349mm 16". This is the more high performance of the 16" wheel sizes. The bike comes with Vision Primo Comet 85 psi tires. When we think back over the history of recumbent bicycles, we can easily call this tire the best ever for recumbents. Back in 1990, this tire would be considered to die for. Thanks to Vision, Primo and BikeE, this tire now comes in 26", 451 20", 406 20", 349mm 16" and even 305 16" (BikeE AT/CT) sizes.

The downside is that this isn't the world's most durable tire. It is best for enthusiasts riding in pleasant conditions. If you ride real hard or serious, get some Slime, tire liners and keep some extra tires and tubes in stock. The performance aspect of the R32 (BikeE's, and any 16" front wheel recumbent) is directly tied to this tire, the Primo Comet. There are other, more obscure 349mm 16" tires, but they are pedestrian. The Comets were designed as recumbent tires.

Again, the trade-off of the Primo 16 is worth it when all is considered. Calhoun's Luke Breen told me that wife Mary rode Primo 16's flat-free on a recent New Zealand tour (16" SWB model). This tire should be even more dependable on an R32.

■ The Ride

I think Vision has really hit upon something with the ride of the R32. This new style of recumbents will be a hit—finally, a Vision that I could see the front wheel. There is just something about really LONG bikes that puts many off. SWB can be overwhelming due to the quick handling and awkward USS or heel interference. Compacts can be too entry level with heavy loads on the rear wheel.

The MWB may just be the ticket. When you climb into the cockpit it feels like a fighter plane. The excellent weight distribution and neutral handling puts first time riders at ease, yet makes enthusiasts feel like pushing the envelope. The bike begs to be ridden—anywhere. Point, click and you are there. The R32 offers the best recumbent suspension of any compact, LWB or Vision that we have tested to date. You will be hopping curbs and zooming around over varied terrain like you never have before.

The new Vision suspension geometry and Cane Creek shock offer a very plush ride with little pogo. The R32 is probably at its best in urban situations—though with Vision's options can be used for anything—even loaded touring.

Okay, so we all know that the Ballistic forks are a bit light duty in the suspension "travel" department. This combined with the R32's



The 1999 Vision R32 MWB—Vision

weight distribution makes for a near perfect suspended ride. Everyone who rides a SWB with suspension marvels at the improvement. Imagine reducing the load on the front wheel a bit (as with the R32), the initial suspension “hits” are much less jarring, and then the Cane Creek rear shock trails it over the bump with the back wheel. This is one of the finer aspects of the R32 design.

■ Performance

The R32 handles great and rides well. It has the potential to be an adequate performance bike, though our test bike suffered from sluggish acceleration and hill climbing due to its weight. My suggestion is that performance riders skip the front fork, fenders, kickstand, racks and try to get the weight down. There is no fairing available for this bike—yet. My recommendation is for the fully loaded version with all of the R32-specific options. I loved the 16” suspension fork and how it softened bumps and worked in unison with the rear.

■ Touring/Use

The R32 should easily tow a BOB trailer with any kind of load. The Vision bag fits nicely on the back of the seat. Optional Vision pannier racks sit nicely under the seat for a balanced load. No rear rack is available, nor is it necessary on the R32.

■ Options & Accessories

All of our R32 accessories worked excellently. The fenders fit perfectly, the seat bag is an exceptional design and the kickstand held the bike up whenever we needed it.

■ Verdict

Vision’s Joel Smith designed the R32. His mission was to make a more user-friendly bike, without a chopper front end, pull-back bars, or a heavy rear center of gravity—and with road bike steering geometry. He wanted a

bike that could be a great entry level bike—but a bike that a rider would never outgrow. The R32 holds more promise than any other Vision design currently being made. It is a design departure unlike any we have ever seen in recumbents. Gone is the boom and fixed seat and allegiance to USS. The R32 is a slick, stylish machine and I do like it. We love the new R32.

Unfortunately the look of the bike suffers in the “engineered design.” A curved main tube and less industrial bottom bracket attachment could have made the R32 the best looking MWB around. Mark Colliton (V-Rex, Barcroft and MC2 co-designer) has labeled the R32 as techno-industrial.

Our loaded version was HEAVY. With dual suspension, a bag, pannier rack and fenders the R32 weighed close to 40 pounds (rack, fenders, WB cage)! It is possible to go non-suspended, with no accessories which cuts the weight a few pounds (est. 34.25 pounds).

The bike feels agile and responsive. The only place where it felt heavy was on hills. The heavy weight and Sachs 3x7 hub were noticeable on our loaded machine—though otherwise this bike is a pleasure to climb with. The ergonomics and wheelbase made for easy climbing posture with no odd traits or special tricks required.

One oddity that we find frequently on Visions is chainline manipulation (no-dish rear wheel/asymmetrical frame). On the R32, the bottom bracket spindle is wide. For some reason it feels wider than other models (according to Vision it isn’t). Some riders commented about acclimation time and the wide pedals—or maybe it’s the closed position.

There are a few comments that kept coming up in R32 discussions. The first is that the front end could use a beautification process. The bottom bracket is welded directly to the head tube and steel plates connect the head tube and maintube. It is very functional and makes for one of the stiffest BB’s we’ve ever experienced, however, it looks industrial. Certainly a curved CroMo tube or even a fairing of some kind could have softened the lines of this bike. The next item was the handling. Many told me that it was the best handling and steering Vision that they had ever

ridden—to which I would agree.

There can be a downside to the MWB—some riders will have ergonomic issues with this design:

1. The handlebars and controls can be too far away for some riders. One taller rider complained about the reach (he rides a Vision R40 SWB).
2. Several riders commented that they would like more adjustment in the telescoping stem. The R32 ASS is stiff, tough and works well. The R32 will take any handlebar that you can put into the stem.
3. The R32 has a rather closed (upright seat, higher BB) riding position. The BB isn't really that high. It is equal to or slightly lower than the seat (susp. fork raises front end 1"). It is the upright FIXED seat angle that will be the biggest potential ergonomic issue for R32 customers. Even a few riders that I would consider skinny commented about their legs coming back into their gut. In an experiment, we relaxed the seat mesh for a noticeable increase in comfort. An adjustable seat recline would be our first wish for the R32—though a minor recline would be enough for us.
4. The combination of the fixed seat back, closed pedal angle, and wide pedal Q factor (width of BB spindle) had more than one test rider complaining about knee pain after riding this bike. Our suggestion is that riders consider these ergonomic issues and that test riders/owners break in slowly while getting accustomed to the new riding position.

The benefits to the R32 and this riding position and are many. It is a good power-generating position these ergonomics allow for the excellent weight distribution, braking and steering geometry. This is a very cool bike and we hope they run with it and refine it.

MODEL.....	Vision R32
TYPE.....	MWB (medium wheelbase) above seat steering
WHEELBASE.....	54"
SEAT HEIGHT.....	26.5"
BOTTOM BRACKET HEIGHT.....	24"/25" (with ft. susp.)
WEIGHT.....	34.25/36.25 (suspended) 39 pounds (our loaded test bike)
FRAME.....	TIG welded triangulated 4130 CroMo
FORK.....	CroMo Unicrown (optional Ballistic 16" susp.)
STEM/BARS.....	CroMo riser/alum. aheadset stem/alum. bars
ASS.....	
SEAT.....	Alum. frame, mesh back, foam covered base

COMPONENTS

CRANKSET.....	Sugino 46-T
BOTTOM BRACKET.....	Shimano UN52
HEADSET.....	YST 1-1/8" Threadless
DERAILLEUR-REAR.....	Shimano RX100
DERAILLEUR-FRONT.....	None
SHIFTERS.....	SRAM/Sachs PG Plus 3x7 7/21 speed
CHAIN.....	KMC Z9000
CASSETTE.....	Shimano 11-32 9-speed
WHEEL-REAR.....	406mm 20" x 1-3/8", Rim N.A., SS spokes, Primo Comet Tire
WHEEL-FRONT.....	349mm 16" X 1-3/8", Wein. Rim, SS spokes, Primo Comet
HUBS.....	RX100 (front)/SRAM 3x7 (rear)
BRAKES/LEVERS.....	STX RC V-Brakes with Dia Compe PC7 levers
PEDALS.....	Wellgo platform w/toe-clips & straps
WARRANTY.....	Lifetime: frame; seat 1 year
COLORS.....	Metallic Teal & Red
PRICE.....	\$1295/\$1495 with front suspension
NOTES.....	Check out the new Vision web site: www.visionrecumbents.com

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Rating

- ✓ **Comfort** — B +
- ✓ **Design/Style** — B +
- ✓ **Drivetrain** — B +
- ✓ **Chain Management** (noise/vibration/chain path) — B+
- ✓ **Brakes/Braking** — A -
- ✓ **Finish Quality** (welds/paint/preassembly) — B +
- ✓ **Performance Potential** — B
- ✓ **Rider Ergonomics** — Upright seat/moderately high bottom bracket=closed riding position.
- ✓ **Best Use** — Anything you can think of; urban/fitness is best.
- ✓ **Best Rider Type/Size** — Seems to fit riders of 5'6" up to just over 6' best. Our 5'4" tester could hold the bike up while seated/at a stop.
- ✓ **Weak Points/Upgrades** — We would like to see Vision offer an adjustable seat recline and update the looks of the ASS stem and BB area.
- ✓ **Market Competition** — The only true MWB in the R32 sense of the definition are the Radius C4 and Redbent which we have not ridden yet.
- ✓ **RCN Value Rating** — B -
- ✓ **RCN "Bob" Rating** — B

Other Voices

▲ **Kelvin Clark**, Angletech, Woodland Park, Colorado
R-32 Rating: No rating

Very good front end geometry, best of any Vision. Handlebar reach, while adjustable, still only for the long armed. An extended stem insert would be welcome.

▲ **Luke Breen**, Calhoun Cycle, Minneapolis, MN

R-32 Rating: C+

The R-32 is probably the best low speed handling recumbent that I have ridden. The large diameter chromoly main tube makes for a very solid feeling bike, yet the rear suspension soaks up the road shock completely. If I want a stiffer ride to minimize bounce at a high cadence all I need to do is put some extra air in the adjustable shock.

What prevents the R32 from getting a grade above C+ are a few minor points. I believe that the seat height is a bit on the high side. The bike is designed for short to medium height riders, yet the seat height might make the reach to the ground a concern for shorter riders. Not many companies have addressed short riders' concerns as well as Vision, so this will likely be remedied soon (maybe even with a seat angle adjustment). Also the chainline makes it difficult to have a wider range of gears without causing the chain to rub a bit. It isn't a problem as it is set up, but I'd like



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▲ **Bob Nohren**, The Energy Conservatory Bike Shop, Florida

R32 Rating: A

In twenty years in the bike business I've never written a complimentary letter about a product, but the new improved R-32 series Vision has accomplished the impossible in recumbent design. It has made a recumbent as easy to ride, even for the beginner, as a regular bike. No more running along side until the customer "gets the hang of it!" The customers are just getting on and starting off all by themselves! They love it. I've tried many others in the same class of recumbent and the ease of handling and operation of the R32 is light-years ahead of anything else in the recreation class of recumbent.

My customers also like the appearance of the R32 better than most. "At least it doesn't look like a railroad tie and a couple of wheels."

The suspension is something we always like to point out. Once the customer is on, we have the rear wheel placed on a 5 inch curb and ask them to push off with all their weight on the seat. After the initial bounce they always smile not only in satisfaction but in disbelief.

My compliments to Vision in not just trying to make enough of them, but improving them at the same time. □

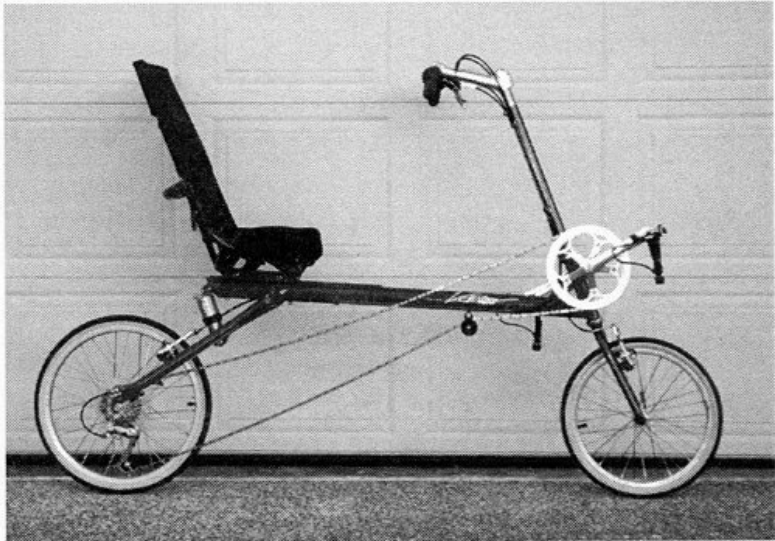
✓ **Mark Colliton**, co-designer Rans V-Rex, Barcroft Virginia and Angletech MC2, Kensington, Maryland.

R32 Rating: B-

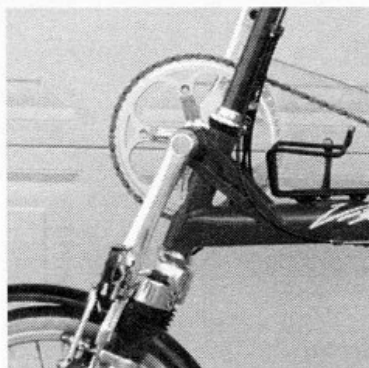
Let me start by saying that I've been a secret fan of Joel Smith's work for a long time. His first production bike, the ATP R20, and his prototype SABRE are just two examples of Joel's innovative thinking. So when I heard that Joel was working on a redesign of the R30 for the '98 Inter-Bike show, I was more than a little curious to get a look at it.

I seldom ask (or in this case beg) Bob to send me RCN test bikes, but after riding the prototype R32 at InterBike I just had to have another ride on a production model. The indoor test tracks at InterBike are not the best place to test any bike, being notoriously tight and slick, so any bike that performs well here is usually worth a second look. After only a couple of laps on the R-32 I was diving in and out of the turns like the bike was a part of me. I was stunned by the way this bike handled. The high bottom bracket and upright seat made it feel like a short bike (SWB), while the open cockpit and longer wheel base give it the stable feel of a long bike. Like a P-38 and a Tour Easy rolled into one. I even had to pull over to take another look at the bike just to make sure I was riding the same one I had signed out. I'm not quite sure what was going on with this industrial look, but its looks disguised one of the best rides I've ever had on a recumbent.

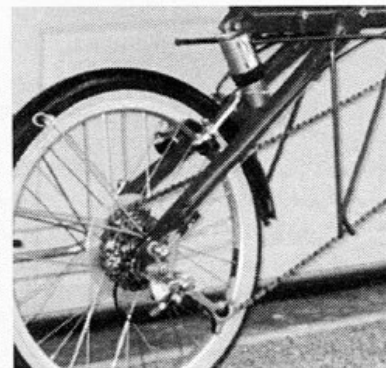
I've had a production version of the R32 for two weeks now and my initial impressions of the bike have changed very little. My six mile commute to work has been completely transformed by the R32. Normally I ride on the road in Sligo Creek Park, but this bike begs to be ridden on the tight and twisting bike path that I usually avoid at all costs. What a blast!



Mark Colliton's RCN R32 test bike #2 with no front suspension. Note: Bottom bracket is one inch lower than the suspension bike



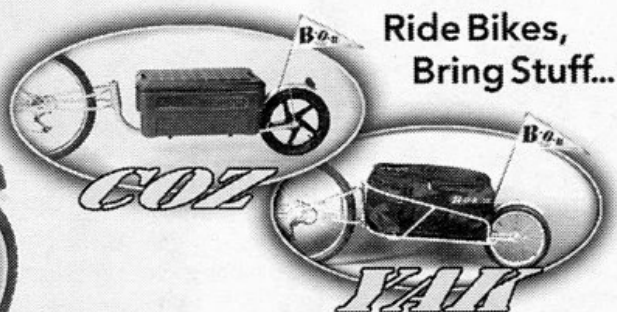
Techno-industrial bottom bracket/mainframe frame attachment



R32 rear suspension swing arm, Cane Creek shock and pannier racks

So, is the R32 the perfect commuter bike? For some people the answer could be, YES! The R32 does have a fairly tall seat and may not fit short people very well. It could also go on a diet! My rear suspension (only) R32 weighed 34 pounds out of the box. While this is not too bad for a bullet proof commuter, combined with that Sachs 3x7 hub, it feels very sluggish on hills. The R32 also uses a very wide crank spindle to help the pedals clear the front brake and fork. This wide Q factor may not affect your ride at all, but my hypersensitive knees noticed the difference within a few miles (and I regularly ride SWB high bottom bracket recumbents). That said, I still think anyone looking for a commuter/city bike should definitely take an extended test ride on the R32. Even style snobs like me will be won over by this great handling bike. Nice work Joel! □

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The Lightning R84

A Composite High Performance SWB

by Jim Langley

My favorite loop is called Smith Grade. It covers only 27 miles but includes two thousand feet of elevation gain; five miles of climbing on a dirt road with sand, gravel, mud, roots and rocks; several stomach-tickling corkscrew descents; a five-minute 50-MPH plunge to the coast; and a ten-mile finishing stretch, almost always blessed by gale-like tailwinds.

I've ridden many test bikes on this circuit. But never a recumbent. I worried that the off-road section, which is quite steep and slippery in spots, would force walking due to traction or balance problems. And that I might crash and trash the bike. Fact is, the route is tricky enough that most of my ride partners have trouble making it on their upright road rigs without walking. And everyone complains about how filthy their bikes get (wimps).

When I received this '99 Lightning R-84 however, it only took a few warm-up rides to convince me to tackle Smith on it. For one thing, this \$4,500 dream 'bent is incredibly light, the most feathery lowrider I've tried. The key is the carbon monocoque frame, which only weighs three pounds (without the seat). That's barely heavier than the lightest wedge frame.

Construction comes straight from aerospace technology. Prepreg (carbon material saturated with epoxy) sheet is cut into about 60 pieces, which are placed a specific way in a two-piece mold. By varying the amount, shape and direction of prepreg pieces in each section of the frame, Lightning dials in the ride characteristics while ensuring optimum strength. Once the two halves of the frame mold have the right pieces in place, a bladder is installed and the mold is closed. There are actually two molds, one for the front and one for the rear half of the frame. (This allows building just about any size frame and makes it possible to remove the bladder following construction.)

After the frame is placed in the mold, the bladder is inflated putting outward pressure on the carbon in the mold. This pressure causes the individual prepreg pieces to bond with one another and removes as many voids as possible from the material. When the mold is opened, out come monocoque frame sections. To finish assembly, the bladder is removed and the two frame halves are glued together. The result is one of the most stunning frames ever, a Ferrari of the bike world if you will. It's a gorgeous thing, gloss black with the carbon weave showing through the clearcoat; the elegantly curving aluminum seat frame and simple handlebar arrangement (also aluminum) adding to its clean lines.

The 84's stealth appearance garners compliments on rides but it's the gossamer weight that you'll probably notice most. Riding a 22-pounder is like shedding 10 pounds of body weight. Suddenly you feel much stronger, you accelerate faster and hills get considerably easier. But then, all Lightnings ascend nicely thanks to rigid frames that transfer power efficiently to the rear wheel and a rider position that feels ergonomically ideal. Even if you try to ride casually, if you're like me, you'll soon find yourself jamming along. Something about the Lightning does that to you. But it's a great feeling, perhaps a little like driving that Italian sports car I mentioned. You try to take it easy but all that get up and go is way too tempting.

The other feature crying out for a test on Smith was the dual suspension. What better way to eliminate the jolts of a rocky trail? The rear end sports small aluminum swingarms that rest on elastomer springs inside the chainstays. As you roll over obstacles, the swingarms pivot stifling shocks. Up front, there's a chrome-moly steel suspension fork. But it's not the traditional dual-telescopic-legs design. Instead Lightning uses a spring built into the steerer tube a la Moulton.

Sling-like comfort is how I'd describe the feel. It's a suspension equally suited to small bumps and medium hits. More importantly, the rear suspension does not interfere with pedaling output as is often the

case on lesser designs. There's no loss of traction nor any negative pedal feedback due to suspension movement.

You're also protected by an outstandingly comfortable mesh seat. The shape is perfect for back support and fit my average six-foot-tall, 175-pound body to a T — ample room for my shoulders and hips. The seat is designed so that most of your weight is supported by the bottom brace and the backrest struts. A cantilevered seat section flexes slightly adding to the bike's already amazing comfort. Lightning ships the R-84 with a sewn-in foam pad on the sitting portion of the seat. But I prefer having breathable mesh beneath my legs, so I removed it.

Interestingly, the seat does not move forward and back to accommodate different leg lengths. Rather, the aluminum boom tube that contains the bottom bracket telescopes for sizing. A constricting clamp held by two pinch bolts holds the tube in place. Unfortunately, there's no locator that keeps the tube aligned with the frame as you make adjustments. So it's necessary to judge alignment by sighting the front derailleur tube and making sure it's lined up with the handlebar upright; not a difficult job but one that could easily be made unnecessary with an alignment mark.

The location of the crank, just above and in front of the front wheel creates heel-overlap on tight turns. This requires some practice to master. It's only trouble when you're crawling along and you must pedal and turn tightly simultaneously just to keep going, such as is the case on one bike path I frequent. At first, I had to stop, and restart because my foot kept hitting the wheel. Now, I've learned to swivel my foot slightly to miss the wheel so I can keep pedaling. I shouldn't make too big a point of this however, as it's something you may rarely encounter. And it's the same thing riders on uprights deal with when a bike has toe overlap. In 90 percent of your riding, you don't turn the wheel far enough to interfere.

Another quirk is a loud drivetrain. Here again, it's most noticeable at slow speeds. Once you're sailing along, you'll barely hear it because wind noise overrides it. The noise comes from the plastic tubes the chain runs through as it passes through and under the frame. They're needed so the links can't strike or wear the bike. There are also two idlers supporting the links and preventing chain slap. I don't notice the noise much anymore and I appreciate how rarely the chain strikes my leg, sometimes a problem on other designs I've ridden.

Shifting and braking are controlled by mostly Campagnolo components. The brakes are Athena dual-pivot sidepulls paired with Ritchey levers bent to fit the handlebars. And the derailleurs are Racing Triple 9 speed with bar-end shift levers. Shifting is as crisp and positive as possible and the 30-tooth chainring/28-tooth cog low gear is adequate for most climbs if you're pretty fit. If you're not fit or ride steep hills all the time, you'll want to opt for lower gears. The braking is excellent and it's nice having mountain-bike-style levers, which allow cable adjustments on the fly—a nice feature on a new bike as the cables stretch and settle in.

My test bike sports Sun triangular-section (aero) rims front and rear. But the hubs are Campy in front and White Industries in back. The Campy hub is laced with 18 spokes; the White with 36. Spokes are DT stainless steel in back and WheelSmith stainless in front. Try as I might on Smith's rough dirt stretches, I couldn't knock the wheels out of true.

Two accessories add appreciably to performance: there's a bag that slips over the back of the seat and is large enough for pretty much anything you'd want to carry on day trips. Not only is it simple to install and remove, it has two compartments and a reflective strip on the back for safety. And there's a Mirrycle mirror, which offers a splendid rear view. The best thing about having a good mirror is that you know when it's safe to ride down the middle of the road, which

oddy enough, is most of the time! Finally, there's a water bottle cage mount on the left side of the frame just beneath the seat. But you could carry more water by attaching a hydration system behind the seat and running the hose over a shoulder if you wanted.

I'm an experienced recumbent rider and one who enjoys racing upright road and mountain bikes. I like high-performance thoroughbred machines. The Lightning fills the bill nicely. And as I expected, it handles Smith Grade like child's play. Climbing the gnarly dirt road, I'm saved abuse by the suspension, which gobbles every rock, stick and hole. Traction is superb because my weight slightly favors the rear wheel. It takes practice learning how to shift body weight to control skids when I hit muddy spots but the feeling isn't much different than sliding on a road or dirt bike.

On pavement, the R-84 really shines. Here the suspension eliminates everything but the most abrupt bumps. You almost float down the road. Climbing is impressive: you settle into a good cadence and work the hill pushing the pace as much or as little as you want. I enjoy working hard on climbs and it's especially nice riding a superlight 'bent made to flatten hills with ease.

Lightning Cycle Dynamics owner Tim Brummer shared a great tip for climbing recommending that I use my hands to push on my legs while climbing (alternating hands so I could keep steering with my other one). He promised a significant improvement and I have to say that though I was skeptical at first, it's actually a very effective trick. You climb faster with less effort.

Handling on the R-84 is extremely quick. Try to spin at 100 rpm or push a gear hard and it takes concentration to keep heading in a straight line. At highway speeds, such as descending Smith Grade's winding descents or the screamer leading to the coast, the slightest twitch moves you sideways before you know it. This is disconcerting at first and then you realize that it takes almost zero input to control this 'bent. The more you simply sit there enjoying the ride, completely relaxing, the easier it is to ride the R-84. And you certainly wouldn't expect anything but quick reflexes in a bike named Lightning, would you?

Overall, this is one of the most capable and impressive bikes I've ridden. I hope to try it with the F40 full-fairing attachment sometime soon (a \$1,600 option) because I think that could be the thrill of a lifetime. □

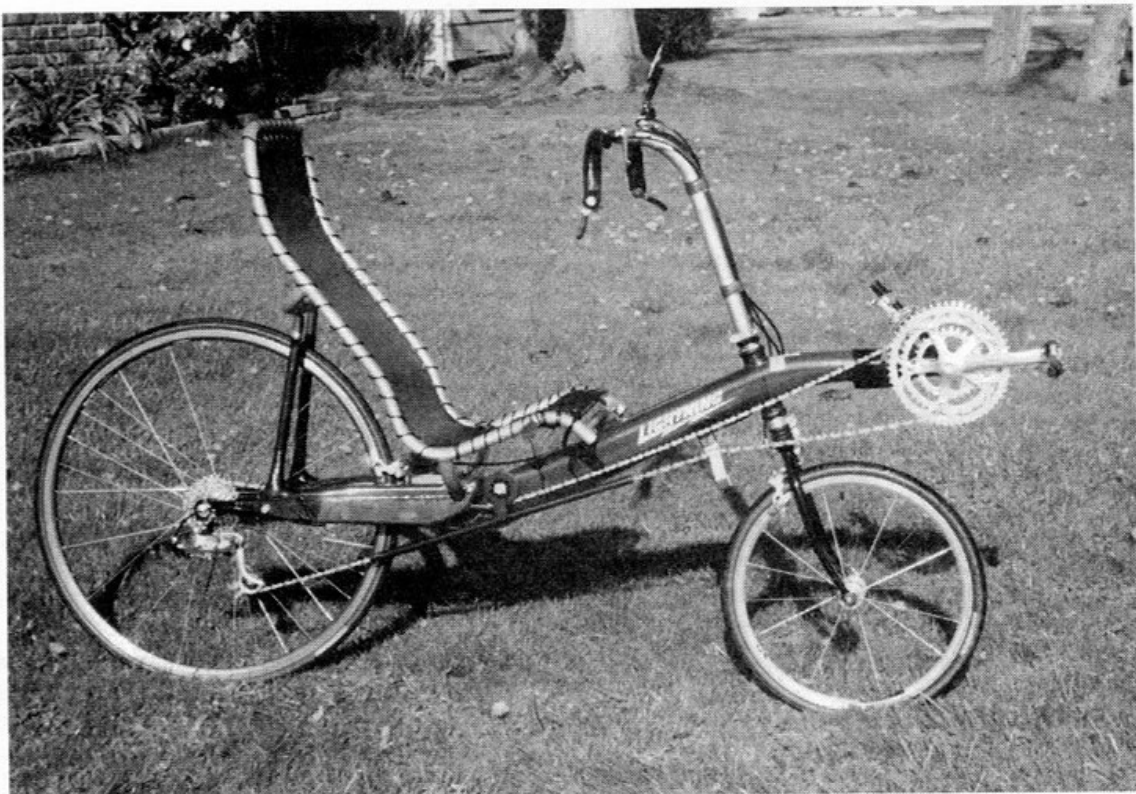
■ **ROAD TESTER RATING/ Jim Langley: B+**

■ **ACCESS**

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805/736-0700
www.lightningbikes.com

*Jim Langley has published hundreds of articles as a tech editor for *Bicycling* magazine for 10 years; has written 2 cycling books and a calendar; has worked 17 years as a professional mechanic; has built 3 recumbents; and enjoys all types of cycling from touring to cyclo-cross.*

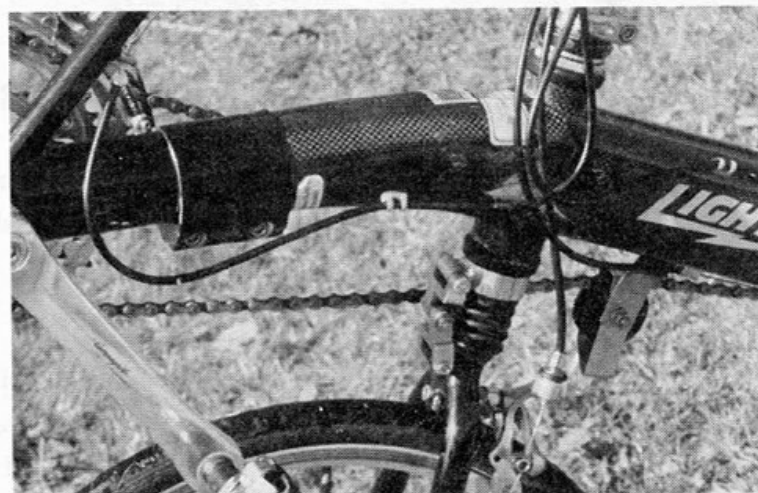
LIGHTNING NOTES: Watch for a *Lightning Thunderbolt* review by Bill Volk in an upcoming RCN. We have requested a *Lightning P-38* test bike loaner from Lightning—though no word on when it will be made available. The last RCN-written P-38 review was in 1991.



Jim Langley's Lightning R84 test bike—Jim Langley



Note rear suspension in the dropouts—Jim Langley



R84 carbon fiber frame and Lightning front suspension fork—Jim Langley

Zach Comments on the Lightning R84

by Zach Kaplan
zakaplan@earthlink.net

I rode a Lightning R-84 equipped with an F-86 fairing as my primary bike from August 1995 to November 1996. The F-86 fairing is essentially an F-40 fairing modified for use on the lower, more laid back R-84. My F-86 fairing sail cloth rather than lycra fabric running between the nose fairing and the tail which increased the level ground speed by at least 10% over that of a stock F-40.

Due to a much delayed delivery, the first ride longer than 40 km (25 miles) I did on the new F-86 was Paris-Brest-Paris. It was a major mistake to enter a 1200 km ride on a new bike. I should have taken the more proven but heavier and comparatively rough riding Lightning F-40 I also had at the time. As a result of both the F-86 not being fully dialed in to my proper leg extension and its front suspension unit collapsing, I only made it 441 km to Loudeac. I had previous fork failures on the prototype F-86 I had borrowed in the Spring of 1995 and based on this history I had told Tim Brummer to bring a spare suspension steerer tube to France. Tim Brummer went there to support Pete Penseyres who was also riding an F-86. I waited at Loudeac and when Tim came back from Brest he did the fork swap. By then I was outside of the time limit for the Loudeac control as I had started with the 80 hour group and so ended my first major ride on the F-86. Even if I could have kept going my knees were wasted, apparently from having the bottom bracket set too close to the seat.

Several weeks later I successfully finished the Paris-Amsterdam race on the F-86 though not in very good time as I still wasn't fully recovered from the knee injuries sustained on PBP. I continued touring in Europe on the F-86 for another two months where the weather protection of the full fairing came in handy.

As I toured I gradually through trial and error reconfigured the chain routing of the lower chain. As delivered from the factory it had some frame rubbing problems in certain gears. I ended up removing the return chain idler near the head tube and taping some cut up drink bottles to the frame in strategic places to protect it from being ground away by the chain. This design oversight was corrected in later R-84s by the use of chain tubes.

During the 1996 riding season I used the F-86 on eight double centuries and was able to finish in some amazing times, often ahead of most of the other riders. The aerodynamics of the full sailcloth fairing made it so I barely had to work to maintain 40 km/h (25 mph) on level ground. 45 km/h (28 mph) was a common all-day cruising speed, assuming no wind. Strong crosswinds were always a problem to watch

out for when riding fully faired.

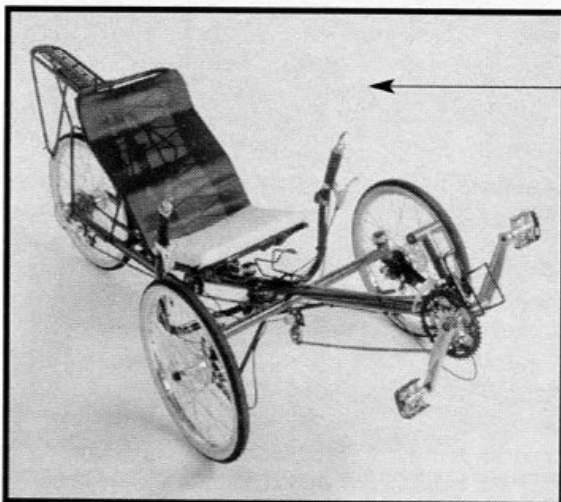
I did the Central Coast Double Century on the R-84 without the fairing as I heard it was extremely hilly. On this ride I learned the R-84 without the fairing is not much faster than an unfaired P-38. I have since learned there are plenty of lower, more laid back, less expensive unfaired recumbents which are faster than the R-84. However just about all of these production low racers are made in Europe and as the R-84 is the lowest of the American SWB recumbents it might just be the fastest unfaired SWB built in the USA.

Later on in 1996 I did the even hillier Terrible Two double century on the F-86 with full fairing. My time was 14:46, a couple hours slower than the fastest upright bikes ridden by much stronger riders but also faster than about half the riders on this ride. I had done the 1995 Terrible Two on the prototype F-86 in 14:47.

Interestingly in 1998 I did the Terrible Two on an Easy Racers Gold Rush with body stocking and had a time 14:38. I attribute the faster time on the Gold Rush to the low bottom bracket providing better blood circulation on climbs and to some extent because of the lack of tension side chain idler on the Gold Rush for reduced drivetrain friction. The Gold Rush with body stocking is certainly slower on level ground by at least 20% and even though the Terrible Two has 16,000 feet of climbing it does have several flat sections where I had been cruising much faster in previous years on F-86s.

I looked at the F-86 as being the Ferrari of bicycles both in terms of performance and handling but also in terms of maintenance requirements and downtime. On the two R-84s I rode I had four forks fail and had three seat frames fail. I am a lightweight rider and usually don't experience these sorts of failures on the bikes I ride. On the production R-84 I also had some aluminum pieces come unbonded, the paint developed cracks from flexing and the rear suspension pivots developed excessive play. Lightning took care of all these problems under warranty. They sent me new seats and forks and I sent the frame back where it was updated with an elastic type of paint, improved bonding of the aluminium parts and ceramic suspension pivots. According to Lightning all of these problems have been taken care of in the latest version of the R-84.

■ ROAD TESTER RATING/ Zach Kaplan: B □



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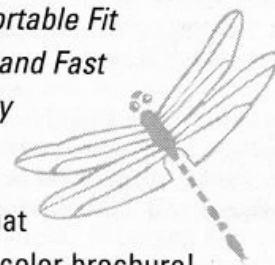
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MODEL.....	LIGHTNING R84
TYPE.....	SWBASS
WHEELBASE.....	45.25"
SEAT HEIGHT.....	17.75"
BOTTOM BRACKET HEIGHT.....	24.75"
WEIGHT.....	22 pounds
FRAME.....	Carbon monocoque with aluminum bottom bracket tube and aluminum swingarms Suspension (swing-arm with elastomer)
FORK.....	Lightning suspension CroMo (unicrown)
STEM/BARS.....	One piece aluminum
SEAT.....	Aluminum frame/mesh/pad
COMPONENTS	
CRANKSET.....	Campy Racing 30/42/52
BOTTOM BRACKET.....	Campy Athena (cartridge sealed)
HEADSET.....	Ritchey Logic
DERAILLEURS.....	Campy Racing Triple
SHIFTERS.....	Campy Bar-End 27 speed
CASSETTE.....	Campy 11-28 9-speed
CHAIN.....	Campy
WHEEL-REAR.....	700c 2 23w/ Conti Supersport
WHEEL-FRONT.....	406mm 20" Conti Grand Prix
HUBS.....	Campy Athena (front); White Ind. (rear)
BRAKES/LEVERS.....	Ritchey Logic
PEDALS.....	Shimano SPD
WARRANTY.....	Frame 3 years; components 1 year
FITS RIDERS.....	5'-6'6"
COLORS.....	Black
PRICE.....	\$4500 (\$3100 frame & seat)

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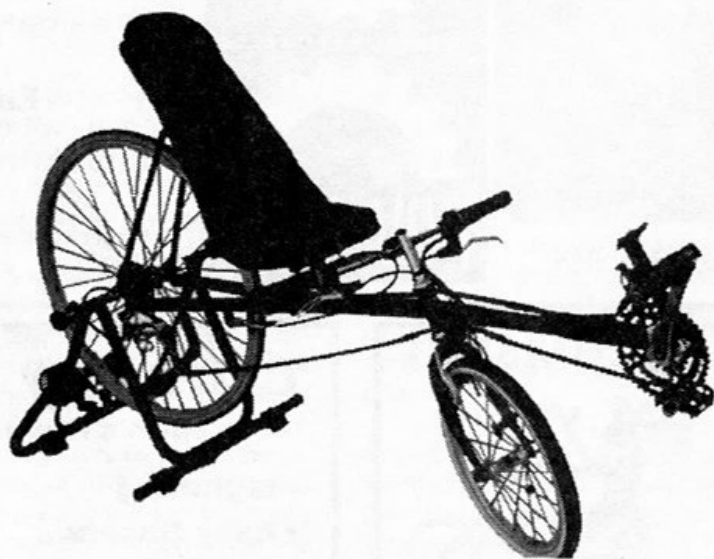
* In 1994, Pete Penseyres rode 603 miles in 24 hours on a production Lightning F-40, to set a new World Record.

** Based on study by Randy Ice, P.T., C.C.E.

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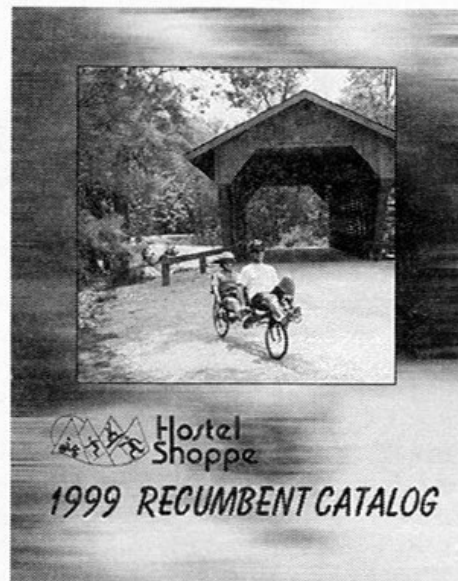
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Maine to Washington

On A Gold Rush

by Jim Giles

thebindlestif@olympus.net

The salty sweat stung my eyes as I rode over the hills of eastern Maine in the hot afternoon sun. The heat and humidity were taking their toll, and I needed to stop for a rest. I pulled over onto the shoulder, thinking that it was gravel. It wasn't! It was soft sand, the bike stopped suddenly, and I fell over. No damage was done except to my dignity. I felt like a boob. There I was, riding an exotic bike, looking like an experienced cyclist, and I'd crashed after riding less than a hundred miles of my journey. I struggled to get my feet unclipped from the pedals while I lay there in the dirt, still astride the bike. I picked up my machine and slunk off to the shade of some nearby trees to cool off. It had been a long day.

I'm retired, 63 years old, and of sound mind. What was I doing out there, alone on a bicycle, 4000 miles from home? It all started when my son coaxed me to take a mountain bike ride with him. I enjoyed it so much that I got my own bike and started riding with friends on the local trails. It was fun, but I gradually realized that long, fast rides on the highway interested me more. After a 50-mile ride "to see if I could do it," I began thinking about making a major bicycle trip. I wanted to do something big while I had the health and opportunity, and the idea to ride coast-to-coast was born.

But there was no way I'd be able to do it on a mountain bike. Too painful! I rode a few highly-rated touring bikes. Even worse! Then I discovered the world of recumbent bicycles. After a few test rides and some extensive research in RCN back issues, I decided that a Gold Rush would be the perfect bike for me. I've never been sorry about that decision! So far, I've ridden my GRR more than 11,500 miles with none of the pain that I experienced on a regular bike. I couldn't have made the trip any other way.

MY BIKE is a 1997 GRR Black Gold modified by Zach Kaplan Cycles for heavy-duty touring. It has a Velocity 406mm 20" rim and Primo Comet 37-406 tire in front, a Ritchey OCR 559mm 26" rim and Ritchey Tom Slick 37-559 tire in back, Magura HS-24 hydraulic brakes, and a Zzipper fairing. The BMX and MTB wheels made it possible to use fatter tires for more strength and shock absorption. The gearing range of 16-132 gear-inches, achieved with a 58/46/20 crankset and 11/34 cassette, gives me plenty of hill-climbing power and the ability to pedal downhill at 40 mph.

A pair of Madden panniers and a rack bag held my gear. Tools went into a small handlebar bag and personal items in a fanny pack. I had no breakdowns, no flat tires, no out-of-true wheels, no broken spokes, no broken cables, no drive-train problems, and no parts fell off the bike, despite miles of hard pounding and wet weather. The chain, tires, and brake pads lasted the whole trip. The only damage was a scratched fairing, caused by the bike being blown over while parked. The GRR performed flawlessly throughout the entire trip and continues to be a dream to ride.

MY IDEA was to ride across the widest part of the country, from the eastern tip of Maine to my home near the western tip of Washington. I'd read several books about cross-country rides, and all recommended going with the wind, from west to east. Nevertheless, I chose to ride against the prevailing wind. Why? I wanted to ride toward home, not away from it. I wanted to save the high mountains for the end. And last, my family could drive out for a short vacation with me in Glacier National Park. I plotted a route that avoided large cities and major highways, and figured that it would take two months to ride the distance. For obvious reasons, I chose to stay in motels instead of camping out.

MY TRAINING was riding, lots of it. I averaged 40-60 miles a day, three days a week, rain or shine, fall through spring. I often rode

with a friend who was training for a tough endurance event. We did lots of hills and kept each other motivated through the cold, gray days of winter. I also worked out at the local fitness center. I felt fully prepared when I set off from Maine and had no problems other than acclimatizing to the muggy weather.

MY TRIP began on May 29, 1998, in Bar Harbor, Maine. I rode northeast up the coast to the Canadian border, then west through central Maine and across the tops of New Hampshire, Vermont, and New York to Ontario. Then I continued west to Lake Huron and north to the tip of the Bruce Peninsula, where I took the ferry across the lake and got on the Trans-Canada Highway. Two days' riding brought me to the Upper Michigan Peninsula, which I followed west to Wisconsin and Minnesota. From there I headed north to the Canadian border, then west for a thousand miles across North Dakota and Montana to the Rockies.

I arrived at Glacier Park six days ahead of my family. I didn't want to wait around, so I used the time making a loop through Canada. First I crossed the Continental Divide at Marias Pass, spent a day rafting on the Flathead River, then headed north into British Columbia. East over the Divide via Crowsnest Pass led me to Waterton Peace Park, where I joined my wife and daughters. We enjoyed a couple of days there together, then met again at Glacier Park. A great ride over Logan Pass on the Going-To-The-Sun Highway marked my third crossing of the Divide.

It was a hot ride through the mountains of western Montana, Idaho, and Washington to the Cascades. Once over Washington Pass, I had a long downhill run to Puget Sound. A short ferry ride, a few miles over familiar roads, and I was back home.

■ TRIP VIGNETTES

HEADWINDS in the mountains of western Maine became so strong and gusty that it was difficult to ride. As I approached the top of a hill, a cloud of swirling dust raced toward me. I tried to keep the bike pointed into it but the wind spun me around and I barely got my feet out of the pedals in time to avoid a crash. It took great effort to hold the bike against the force of the wind. I was blown back every time I tried to ride. I had to push the bike with my elbows locked and my body in a straight line to get over the hill.

The next day was the climb over Dixville Notch in New Hampshire. The last mile was a steep struggle against gusty winds. Near the summit I was down to my 18-inch gear, wobbling all over the lane, trying to keep the bike going uphill. I had to get off and push for the last hundred feet. At the top, I saw a sign indicating that I'd just climbed a 10-percent grade and that the descent would be 12-percent. The blustery wind funneling through the narrow gap in the rocks made it feel like I was in a hurricane. It was so gusty that I had to push the bike downhill for a hundred feet before it was safe to get on and ride. What was that again? You pushed your bike DOWNHILL? Yep.

THE DAIRY FESTIVAL PARADE had blocked the only road through the little town of Enosburg Falls, Vermont. Rather than take a thirty-mile detour, I rode over to watch the parade. A guy told me that the grand finale would be a herd of dairy cows walking through town. That bit of news was my incentive to join the parade, and I casually slipped in. Riding the Gold Rush, I slowly passed floats, tractors, horsemen, an army tank, and was nearly conked on the head by the flag twirlers as I went by a marching band. All the time I smiled and waved to the crowd, getting many "Neat bike!" comments from the bystanders. At the end of the street, I passed through the crowd and rode on. My five minutes of fame were over!

SPEED LIMIT 80 KM, read the sign at the top of a hill near Denbigh, Ontario. I stopped and looked at the long, curving descent below. There was no other traffic in sight, the road belonged to me. How fast could I go using only gravity? I released the brakes and started rolling, slowly at first, then rapidly accelerated as the bottom dropped away. The vibration produced by the rough road made it difficult to see the scenery as it passed by in a high-speed blur. The wind got under my visor and tried to blow my helmet off, and my eyes watered in the adrenaline-filled descent. I had to feather the brakes to make it around a curve, then the road flattened out as I crossed a bridge at incredible speed and zoomed up the hill on the other side. I checked my computer and found that I'd hit 49.9 mph. Oops, I'd exceed the speed limit a bit, but what a blast!

"A **RECUMBENT** bike just like yours," the pair of tourists in Tobermory, Ontario, emphatically told me as I waited to board the ferry, "except the rider was a girl." Wow, another bicycle tourist, the first I'd heard about since beginning my trip. And on a recumbent, too! I wondered why I hadn't seen her around the small town.

When did they see her?

"Yesterday morning, on the way into town."

And, was she wearing a yellow jacket?

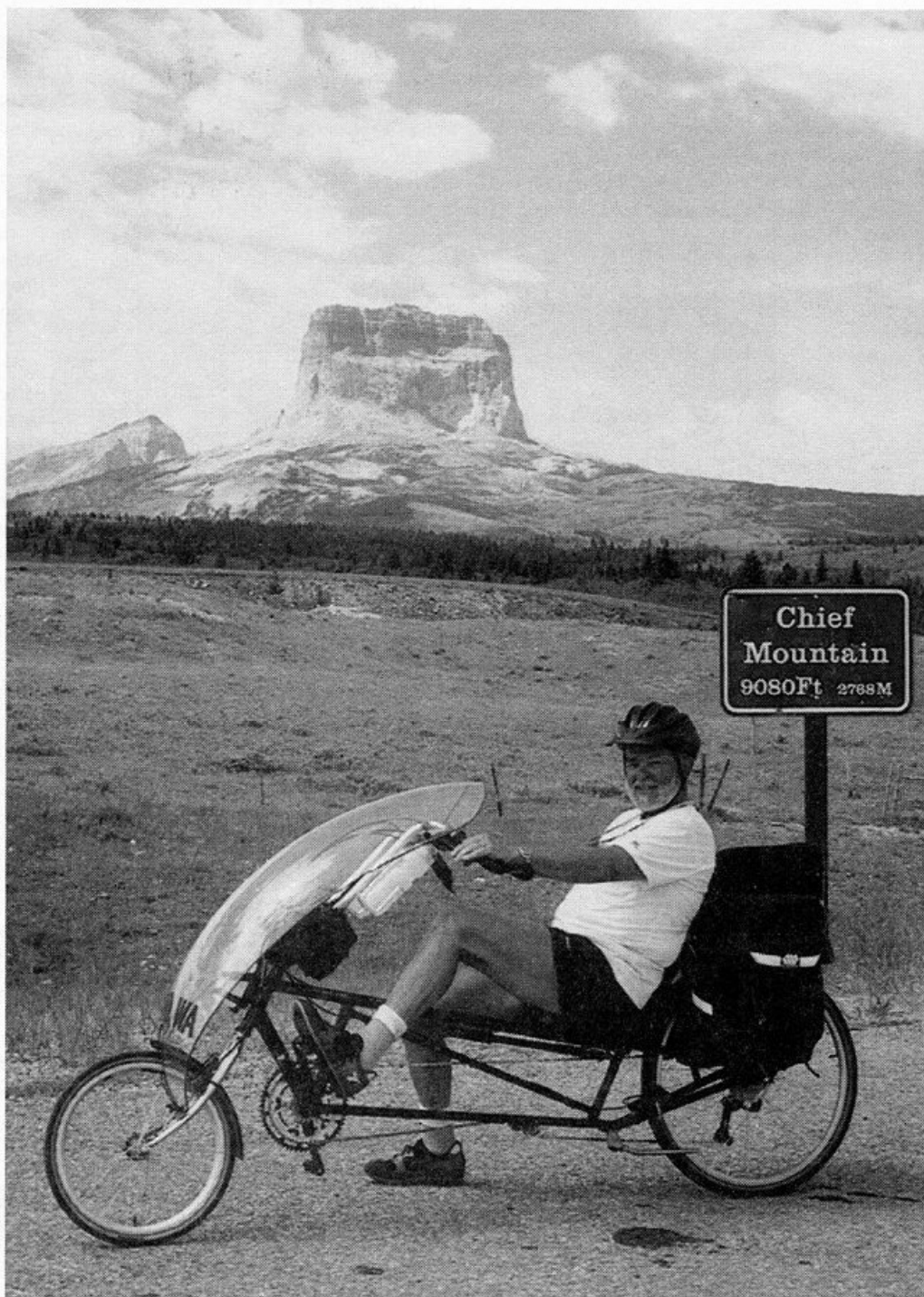
"Yes, and a red helmet, too."

Oh, that was me (a girl with a beard?) . . .

THE WEATHER CHANNEL predicted a calm, fair day with temperatures in the 80's for northwest Minnesota. But a different forecast with Doppler radar showed thunderstorms directly in my path. Which to believe? The sun was shining when I started, but it soon disappeared in the thick overcast. Ominous thick black clouds began gathering in front of me, and soon it got dark, cold, and windy. Lightning struck the ground several times. I pedaled hard to the next town as light rain began to fall. Spotting a gas station, I sprinted for cover under its roof just as the skies opened up. Thunder, lightning, and pouring rain made things exciting for a while. I had to wait out the storm at the gas station for almost four hours. While I was there, my parked GRR attracted attention and I was interviewed by the local radio station. The rain stopped around midmorning, and within an hour the sun came out, the temperature rose to the mid 80's, and I had to put on sun block. Both forecasts had been right!

FOUR HOURS to Minot. I'd ridden 50 easy miles that morning before breakfast, then 17 miles against a gentle headwind. Only 48 miles more at 12 mph on the North Dakota plains and I'd be finished for the day. But then the wind got stronger and the gusts more ferocious. Many times I was blown off the road, saving myself each time by hard braking. With 32 miles to go, my speed had been slowed to 8 mph by the wind, so it was still four hours to Minot. A bird tried to land near me by the side of the road, but the wind blew it over every time it put its feet down. Eventually it gave up and began flying again. The bird looked like it was getting very tired, like me. With 24 miles left, I could manage only 6 mph against the gusty wind. **STILL** four hours to Minot! Arghhh! My slow progress was discouraging and I wondered if I was going to make it.

I continued against the unrelenting wind through the flat, open country. Finally, after more than seven hours total, I reached the outskirts of Minot. The road turned up a steep plateau, putting the wind behind me. My fairing caught the wind like a spinnaker, driving me off the road at high speed. I braked furiously to keep from sliding down the embankment. Twice more and I had to swallow my pride, get off, and start



Jim Giles and his 26/20 Gold Rush with Magura brakes—photo courtesy of Jim Giles

walking. Without my weight on the bike, the wind gusts lifted the front wheel about three feet off the ground. It was like holding onto a rearing horse! I hung on until the gusts subsided and the bike dropped back to the ground. At the top of the hill I found relief at the closest motel. It had been a 13-hour, 115-mile day! According to The Weather Channel, the wind strength was 24 mph with gusts to 41 mph. Any questions why I took the next day off for R & R?

A COLD DRINK was what I badly needed. Hot, red-faced, and thirsty from riding in the 95-degree heat of eastern Montana, I was glad to see a convenience store in Poplar, on the Fort Peck Indian Reservation. A pair of eastbound cyclists were outside, and as we talked, several customers passed us and went in the store. Then one of them, a large Indian, came back out and said, "Here, you're going to need this." It was an ice-cold liter of bottled water. I was taken completely by surprise! After I thanked him, I got back on my bike and headed down the road, feeling a little cooler. His unexpected kindness was as refreshing as his gift.

FLIES plagued me as I rode through the hills in southern Alberta. The little, fast-flying buggers swarmed in a dense cloud around my head,



Somewhere in the middle of th USA—photo courtesy of Jim Giles

making it risky to breathe through my mouth. Some got in through my helmet vents and crawled around on my bald head. Arghhh! I couldn't get away from them. If I rode fast downhill to escape, they'd be back as soon as I had to slow down again. Then I met a long line of cyclists on an organized tour coming up the hill toward me. Nonchalantly riding over to the nearest rider, I made some small talk and deftly transferred my cloud of flies to him. Then I sped away down the hill. I wasn't bothered by flies for the rest of the day!

LOGAN PASS would be the high point of the trip for me, not only because of its elevation and scenic beauty, but because my family would be there to see me climb it. From our motel at St. Mary, I could see up the canyon into the Park. The view was marvelous, with high mountains everywhere. I'd been looking forward to riding the famous Going-To-The-Sun Highway since I first began planning the trip. To say that I was excited was an understatement! I made plans with my wife and daughters to meet at the summit for lunch, then gave them all a hug, hopped on my bike, and headed up the canyon.

I'd been climbing for about an hour, thoroughly enjoying myself, when a car pulled closely alongside. The passenger stuck a video camera out of the window and began taping me from close range. I wondered if she had a wide-angle lens, or all she'd see would be a close-up of my sweating nose. As she taped away, the car slowly forced me closer and closer to the side of the road, and just as I was about to crash into the ditch, she said "Thanks," and the car drove away. A little nearer with the car and she might have created a spectacular bicycle crash (and heard some choice swearing, too)!

The rest of the drivers seemed to be on their best behavior when passing me on the narrow road. Many of them gave me a thumbs-up or shouted, "Nice bike," as they went by. Although the final ten miles to the summit were continuously uphill, I was able to ride all the way in the middle chainring. The scenery was fantastic, with high, steep mountains all around, some with glaciers on their flanks. I could see a long way up the pass where a waterfall dropped into the canyon below.

At the summit I found an enormous parking lot packed full of cars and RV's, with others prowling around looking for a parking place. There was a Disneyland-like atmosphere to the scene. Crowds of tourists were bustling about and cars were lined up waiting to get into the parking lot. Not at all what I had expected! I tried to ignore the crowd and concentrate on the beauty of the high mountains instead. I located my family and we

had a nice picnic on some big rocks near the road.

Then it was time to make the descent. The road was narrow and twisting as it followed the contours of the mountain downhill for 20 miles, with fabulous views all around. I didn't need to pedal at all and had to keep my speed slow to safely make the turns and to keep from overrunning the cars. At 25-35 mph, I was going faster than most cars dared to travel. Near the bottom, I got stuck in a string of traffic that was backed up behind a slow driver. When there was room to pass, our whole line went around him. I wondered what he thought about being passed by an old guy on a bicycle?

"**NICE BIKE!** My husband has a Gold Rush, too," called the woman as I rode into a small town on the eastern edge of the Cascades. I couldn't see who it was because of the parked cars and RV's lining the road, so I dismounted and walked across the street to say hello. Hey, she was kinda cute! We had just started to talk when her husband walked up, a big scruffy guy with several days' growth of whiskers sprouting from his face. I recognized him as soon as he began to speak: it was none other than RCN's own Bob Bryant! We spent an hour talking about bikes, the biking industry, and my trip. It was good to meet a kindred spirit, someone who understood what I was doing. What a coincidence to cross paths 'way out there!

WASHINGTON PASS awaited me as I left Mazama at dawn, heading up the North Cascades Highway. The sky was clear and the morning air was cold as I followed the smooth road up the narrow, twisting valley, the

scenery improving with every mile. The sun was just breaking over the mountain tops to the east when I rounded a curve and had my first view of the magnificent Early Winters Spires. They glowed in the sunlight above the still-dark forest below. I knew that I was almost to the summit and, wanting to prolong the moment as long as possible, sat in a patch of sunlight and enjoyed the view. I felt good about myself and my trip. It seemed only yesterday when I left Bar Harbor.

Finally I stopped dawdling and started up the last climb to the pass. The road was cut into the side of the mountain and the grade looked steep from below. But when I rounded the final switchback, I found it no tougher than many I'd climbed before. The view from the summit was grand, with high mountain peaks all around. I could see far to the east down into the narrow valley I'd just ridden.

This was the emotional end of my journey. No more mountain ranges to climb, no more open plains to cross, no more thunderstorms to survive, no more stifling heat to endure, and no more headwinds to battle. I put on my windbreaker, cleaned my goggles, wiped a tear out of my eye, gave a loud Tarzan yell, and pushed off. I rapidly dropped down the pass and reached 45 mph with no effort at all. Two days later I was home.

■ CONCLUSION

OTHER BICYCLISTS were rare on the first half of my trip, but after I joined the Adventure Cycling Route, I met riders almost every day. Most came from the U.S. and Canada, a few from Europe and New Zealand. Their ages ranged from 14 to 75, some rode fast, some rode slow, and they all seemed to be having a good time. Every time I spotted a bicyclist coming toward me, I'd wave heartily and we'd stop to exchange information about routes, road conditions, weather, restaurants, etc. No one mentioned seeing any other cyclist going west like me.

GOING INCOGNITO wouldn't be possible on a Gold Rush. It attracts too much attention. Most people I met had never seen a recumbent and assumed that it was home-built. Several times people flagged me down, wanting to ask questions about the bike. I traded smiles and waves with small kids, teenagers, men mowing lawns, women walking dogs, linemen up poles, flaggers at construction zones, bulldozer operators, fishermen, pickup drivers, motorcyclists, cowboys, farmers, policemen, train engineers, and the pilots of an ultra-light and a crop duster. The only people who didn't return my waves were women driving cars and elderly tourists in RV's.

DON'T BE OVERWHELMED by the huge distance to be covered when planning a long, muscle-powered trip. It can seem so very far, almost too far to comprehend, but doing it isn't impossible. The total distance isn't a factor, but time is. You need to take sufficient time out of your normal life, putting other things aside, to focus entirely on the journey. With enough time, you can cover any distance, no matter how far. Every day you just get on your bike and ride. It will take longer than a car or plane, but eventually you'll get there, given the determination to keep going day after day. And it doesn't take a gonzo athlete to complete a long trip. Hey, look at me!

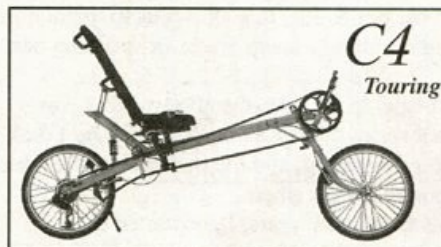
WHAT DID I GET OUT OF IT? Adventure and freedom, the thrill of encountering new people and places. Excitement from being a bit of a rogue and breaking the bonds of convention, of not feeling normal or ordinary. Self-confidence from handling difficult situations, of testing physical and mental limits despite being tired, scared, and lonely. The knowledge that "I DID IT!" Simply put, it was fun. . . .

DID THE JOURNEY CHANGE MY LIFE? No, not at all. It was a great experience which I enjoyed immensely, but it didn't change me. It didn't take long to ease back into my normal life and routine at home. I'm still riding my Gold Rush several times a week and am preparing for next year's endeavors.

WOULD I DO IT AGAIN? Yep! ☐

■ **STATISTICS:**

- Total distance ridden = 4350 miles
- Length of trip = 59 days (including 5 rest days)
- Average distance per riding day = 80 miles
- Average overall riding speed = 13.3 mph
- Maximum speed reached = 49.9 mph
- Longest ride = 120.9 miles
- Fastest average speed = 16.6 mph for 90.4 miles
- Slowest average speed = 10.3 mph for 45.3 miles
- Average day on road = 8 hours
- Longest day on road = 13:15 hours
- Weight of fully loaded bike = 62 pounds



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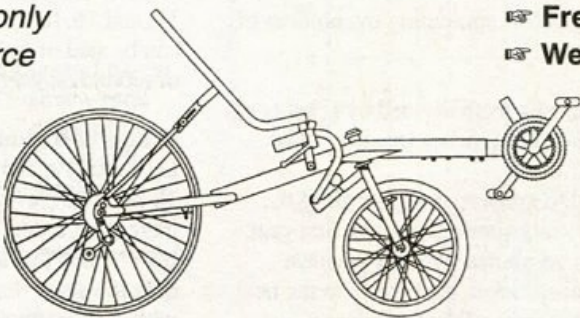
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Gearing: The Dusty Corner of Recumbent Design

by Scott R. Chilcote

Most bicyclists who like performance-oriented riding know the reasons to have well-designed gearing on their bikes. A range of gearing suitable to the road conditions, and to the abilities of the rider, is essential to riding efficiently. Of equal importance is having a properly stepped arrangement of gears between the endpoints; this allows us to maintain a steady cadence when we're not climbing a steep grade, or sprinting past a competitor.

My interest in bicycling began in the late seventies, when I was fortunate enough to read a great series of articles in *Bicycling!* by Frank Berto. He covered every aspect of gearing, and the impression it left has made me conscious of its importance ever since.

While I've had road bikes for twenty years, I got started in recumbent bicycling only a year ago when I bought my BikeE "RoadE", with its Zzipper fairing. I'll admit I didn't choose it after extensive comparisons; I didn't have the ability to evaluate a variety of different recumbents in central North Carolina. My wife purchased a BikeE CT a couple of years earlier, as a way to bicycle despite tendonitis in both of her arms. I resisted temptation for several months before borrowing her bike and trying it out. You can guess the rest!

■ How Good is My Gearing Setup?

After making several trips on the RoadE, I began wondering about its gearing. Have you ever felt that if you shifted up to a slightly higher gear, you'd be able to speed along for a while? Well, I'd get that feeling, only to find that when I shifted up to the next higher gear, nothing felt different. Then I'd try to select the next higher one, and ugh! It would be a BIG step up.

Later I would be climbing a rise, and want to shift down gradually to maintain a good cadence. A similar thing would happen: after a shift, or even two, things didn't feel very different. Then the next downshift would have me spinning like crazy.

■ The Meaning of Gear-Inches

I decided to get my calculator and figure out the gearing for the RoadE. Most books on bicycling spare a few words on how to compute bicycle gearing, but don't explain what's really going on. I've found that the easiest way to think about it is to imagine riding on an old-fashioned high-wheeler, or maybe a unicycle, with the cranks attached directly to the wheel. Imagine trying to pedal a wheel five feet across, or sixty inches. Getting it moving would be tough! Once you got going, though, you could probably move pretty fast. Now imagine the same thing, using a wheel eighteen inches across. You could get it going quickly, but cranking fast wouldn't get you very far. This is the reason we use gear-inches. When someone tells you that they like to spin a seventy-inch gear, they're really saying that they feel comfortable turning the equivalent of a seventy-inch wheel. Not so hard to follow, eh?

■ A Bit of Math...

Here's the formula most bike books give for computing the number of gear inches:

Gear (in gear-inches) = number of chainring teeth divided by number of cassette cog teeth times wheel/tire diameter in inches (measure this).

This is the most math you usually need to know to compute all of the gearing for a bicycle. You calculate gearing starting with the first gear, which is the largest freewheel sprocket combined with the smallest chainring. Count up for each freewheel sprocket, then move to the next larger chainring and start over. To compute the BikeE's gearing,

however, there was another problem to solve.

■ Figuring out Internal Hub Gearing

As you may know, most of the BikeE line comes with an (optional) Sachs 3x7 hub. These aren't rare on recumbents; Linear, Vision, Radius, and other manufacturers use them. The internal three-speed gearing had to be worked out. I did some research by begging for information on the Internet Newsgroup alt.rec.bicycles.recumbent, and eventually someone told me how the Sachs freehub gearing works. To calculate the gearing, you take the gearing for the chainring/freewheel gears and multiply by 0.73 for the Sach hub's first gear setting, by 1.0 for its second gear (that's easy), and by 1.36 for its third.

This may seem like a lot of calculating, but I'll show you a very easy way to get the numbers a little later (hint: think web page). My next chore was to go to the RoadE and find out all of its gear sizes, along with the size of the rear wheel. The numbers came out as

Chainring: 46 teeth

Freehub sprockets: 11, 13, 15, 18, 21, 24, and 28 teeth

Rear Wheel: 20.3"

Sachs Gear factors: 0.73, 1.0, and 1.36

Now it was time to, as they say, "Do the math!"

■ The Numbers Tell the Story

Here's a table of the gear-inches:

Hub Gear	Chainring	Sprocket						
		28	24	21	18	15	13	11
1 (0.734)	46	24.5	28.6	32.6	38.1	45.7	52.7	62.3
2 (1.0)	46	33.4	38.9	44.5	51.9	62.3	71.8	84.9
3 (1.362)	46	45.4	53.0	60.6	70.7	84.8	97.8	115.6

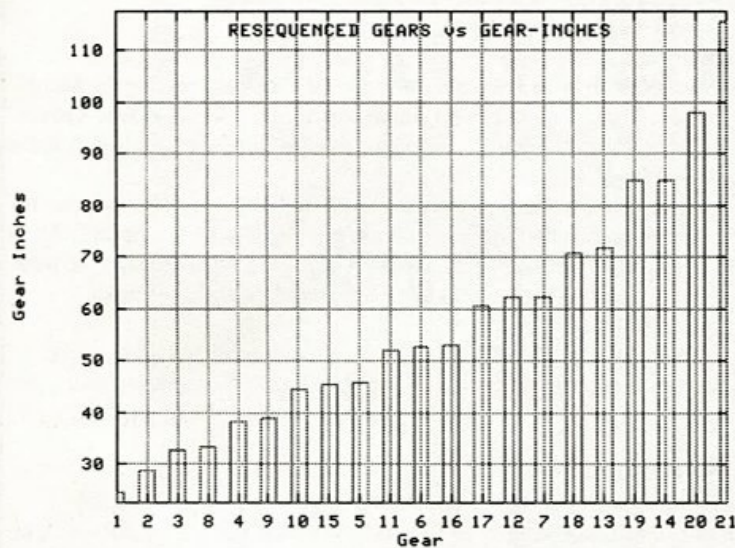
Just for grins, let's put the gear numbers next to these values:

1	2	3	4	5	6	7
24.5	28.6	32.6	38.1	45.7	52.7	62.3
8	9	10	11	12	13	14
33.4	38.9	44.5	51.9	62.3	71.8	84.9
15	16	17	18	19	20	21
45.4	53.0	60.6	70.7	84.8	97.8	115.6

After looking at these results, I began to see the problem. Look at gears 6, 11, and 16, for example. All three of them are very close to 52. The same can be said of 5, 10, and 15, which are all nearly 45. In fact, there are lots of redundant gears in this bunch.

■ Lots of Redundant Gears!

Let's really make these duplicates stand out. Have computer, will graph! To be extra clever, though, why not shuffle the gears to put them in increasing order? Looking at Figure 1, we see a very unpleasant situation. It's obvious that a lot of these gears match each other. In fact, if you count only the gears that differ significantly, the twenty-seven we started out with are down to eleven different gears!



So, how did this happen? Well, I prefer the "dusty corners" theory. I don't think manufacturers take the time to consider the details of bicycle gearing. When I look at web pages for gearing specifics, they almost never list the individual sprocket sizes on the freewheels for their bikes. I get the impression that many of them just pick the top and the bottom end of the range of gears, then select the cassette. As you can see, this allows a great big "gotcha!"

It isn't normal to lose over half of the available gearing in duplicate combinations. When you consider the expense and imposition of the Sachs 3x7—no rear quick release², having to carry a wrench to fix a flat, and having to twiddle with the cable tension to get the hub shifter working properly—it really should be providing more value than this!

We can't single out the RoadE for using this gearing with the Sachs 3x7 hub, either. Fact is, even with a different wheel size and a different chainring, the redundancy of this 11-28 cassette varies little. The Linear CLWB, the BikeE AT & CT, and other models ship with the same setup.

Can the Sachs 3x7 Do Better?

Let's consider the question whether there really has to be this much redundancy in the Sachs gearing.

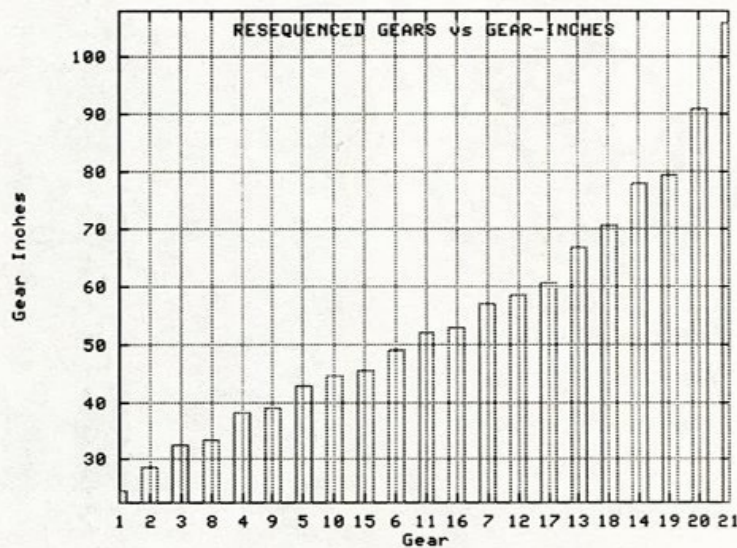
Being a bit of a computer nerd, I made my life easier at this point by writing a program to compute and graph the gearing for this hub. In fact, I made it available on the World Wide Web; just aim your browser at <http://www.pagesz.net/~scotty/gear-form.html>. I then used this program to run graphs for several combinations of gearing, just to see if it could be made to work better.

I didn't use hypothetical gearing, either. Since the Sachs hub uses a standard Shimano 7-speed HG cassette, I used gear combinations that are currently available for similar ranges of gears. One place this list is online is <http://www.sheldonbrown.com/ha-k7.html#7cassettes>.

Have a look at the graph for 12-14-16-18-21-24-28 in Figure 2. This is the "E" cassette. Since the smallest sprocket went from 11 to 12, this drops the high-end of the gear range to 106, but it provides a wonderfully even range of gears. As an example, the Vision R32 uses the Sachs hub with this cassette.

Doing Better Still: Yes, It's Possible...

What if we wanted that higher gear, though? As I've mentioned, I like to go fast when I can. When I commute on North Carolina's narrow rural highways, getting up to speed quickly helps me stay out of risky traffic situations. That 11-tooth gear comes in handy. To get it back and still have smooth gearing requires some work. Due to the limited selection of pre-built cassettes, we have to consider building our own.



This becomes evident when you look at the list of pre-built cassettes. Here's a list of the HG-70 cassettes that have 11-tooth cogs:

Name	Sprockets
ab	11 12 13 14 15 17 19
ac	11 13 15 18 21 24 28
ai	11 12 14 16 18 21 24
am	11 13 15 18 21 24 30
Megarange	11 13 15 18 22 26 34

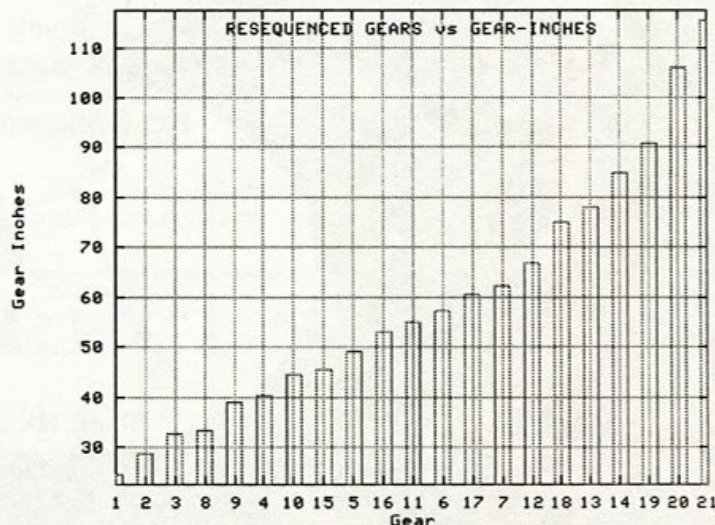
A close look reveals that all of the cassettes that have a 28-tooth or larger sprocket at the big end have the same choices for most of the smaller sprockets. The RoadE's 11-28 cassette is the "ac" model in this table.

So how hard is it to combine sprockets from these cassettes? Another of Harris Cyclery's web pages, www.sheldonbrown.com/k7.html#7cassettes mentions that most of the sprockets on these hubs are interchangeable. The 11-tooth sprocket has to be removed before the others can be disassembled. All we have to do is figure out which other sprockets to use with those from the "ac" cassette to create the best combination.

Looking Good!

The "ai" cassette's gearing provides the largest number of different gears when compared to the "ac" model. Using my trusty program to compute different combinations, I came up with the arrangement 11-12-14-18-21-24-28. This combines gears from the "ac" I had, as well as the "ai" cassette. This results in a graph of gearing that's particularly appealing.

Figure 3: Graph of Custom 11-12-14-18-21-24-28 cassette



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Compare this graph to the gearing in Figure 1, we're doing great. We have the same range of gearing provided with the RoadE, but now there are well-spaced gear selections throughout the range.

■ Clearing out the Dust

I encourage each individual rider to figure out the best gearing for his or her needs. This problem has no single best solution for all riders. On the other hand, it's a problem we, as customers, shouldn't be required to solve in the first place.

There's no quantum physics involved in designing useful gearing for a bicycle; even one that has internal hub gearing like the Sachs 3x7. Hubs with even more internal gears have been introduced recently, but the math required to design gearing with them only requires a grade-school education and a calculator.

If we pay a few hundred dollars for a mass-produced upright, we might expect significant details to be overlooked. When paying in excess of a thousand dollars, however, we deserve a well-finished product.

■ The Bike-Shop Fix

Poorly designed gearing doesn't "break" a good bicycle, not by any means. In fact, knowing what I do today I would still have gladly bought my RoadE, although it's been discontinued. Having chosen a good bike shop, though, I would have asked for a different cassette such as the "E" to be installed. One other possibility shows promise: some shops even sell individual sprockets for the Shimano HG cassettes. This allows even more flexibility in designing good gearing, and at potentially lower cost.

■ Credits

I'd like to thank Richard Stallman for GNUPlot, a free graphing program; Larry Wall, who wrote the Perl programming language, and Sheldon Brown, for his very informative web site. Without these contributions this article would have been a whole lot of trouble! □

1 To be really accurate on the wheel size, sit on the bike and measure how far the wheel rolls in one complete revolution, then divide the result by Pi (3.14).

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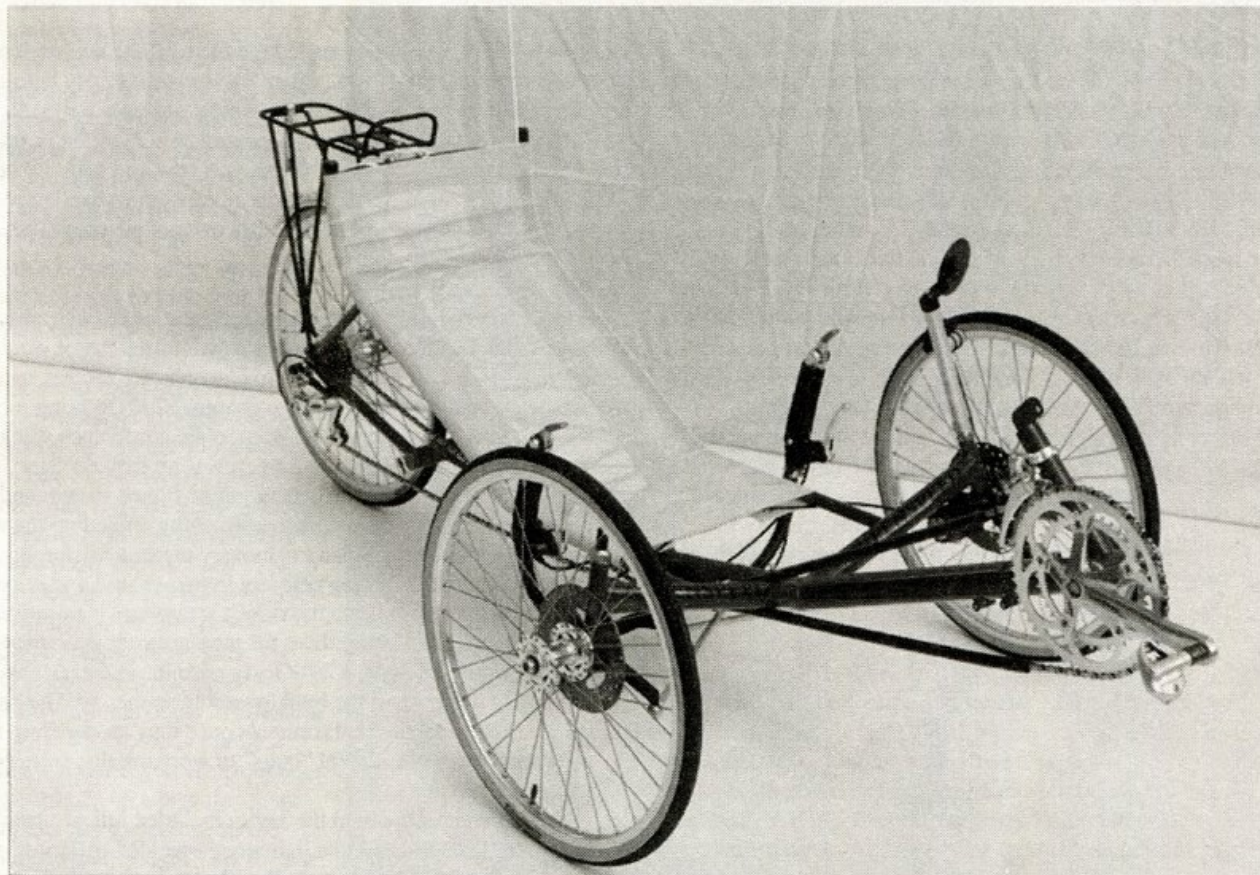
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Here is what other GTS owners say:

"With other trikes I have to brake for corners and lean to keep the inside wheel down. With the GTS I can just blast right through, often without braking and the leaning seems more optional. When I took the GTS down the twisty Highway 1 decent for the first time it was a revelation. Never before had I yelled out loud going around those corners. Normally I am a tame descender. On the GTS I was amazing myself with how fast I could get around those corners while

staying in complete control." Zach Kaplan—Muir Beach.

After having experience with three other recumbent trikes, the Greenspeed still leaves me speechless.

It is an absolute pleasure fast or middle speed. The only time it goes slow is when you have the brakes on. Its excellent design makes it very stable. All my other recumbents flipped easier. This doesn't even want to lift a wheel, but if it does, you just move your weight. Sometimes your head is enough. Comfort, yes, my heated waterbed is wonderful. I really feel I should write about what faults this trike has, but really couldn't find fault" —Greg Potter, Victoria.

The GTS is also my everyday transport, equipped with lights and pannier bags. However the GTS is not for everyone. If you would like a more upright seat, look at our GTR, and if you would like even more of a thrill, ask about our race trikes—Ian Sims, Greenspeed.

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Living With A Leitra

by Nickolas E. Hein

heinhpv@juno.com

In many parts of my native Seattle it would be quite practical to do most of our travel by bike year-round if only there were a bike that gave reasonable weather protection. This would be a great situation for those of us who love to ride but don't have the time to do it unless we work it into our regular routine of commuting and running errands. I think about this a lot and I knew that the Leitra was out there beyond my reach, but I sure would have liked to see one and try it out. I didn't expect this to happen because the Leitra is made in Copenhagen, Denmark and I didn't know of anyone in my area (North America) who had one. You can imagine how surprised I was to see one parked on campus as I was walking between classes last month. It was painted bright yellow, which really made it stand out on this grey Seattle day. I dropped a note inside with my e-mail address asking the owner to contact me. It turned out to be Adam Karp, a student at the university. The rest of this story is about how he came to own the Leitra and what it's been like. Adam is one of the first people to bring a factory-new Leitra into the United States and has been using it as his primary transportation for getting around Seattle this Winter. I took notes during a recent conversation we had to find out how he discovered the Leitra, how he got it and how it's worked for him.

■ About Leitra

Leitras are built by Carl-Georg Rasmussen in a small building near Copenhagen, Denmark. In business since 1980, Carl-Georg has produced more than 170 trikes at a rate of 1-2 per month to customers in all parts of the world. About 30 have been sold in Denmark, 80 in Germany and the rest to other countries. The name "LEITRA" stands for the phrase Light Individual TRANsport in a variety of Western languages.

■ Adam's Background

Adam has had a long-time love affair with cycling. In 1995, while riding his Cannondale upright, he was involved in an accident. He slipped on a bus ventilation grate in downtown Seattle and spent 7 hours in the ER (mostly waiting around) and ended up losing 6 teeth and sitting in the dentist's chair for over 40 hours. He got back in the saddle, but when he saw his first recumbent in R&E Cycles (a Vision R-40) it made a lot of sense to him. He tried it, liked it, and bought it. He equipped it for all-weather unfaired commuting with lights, fenders and racks. Now that he'd discovered the tip of the iceberg of diversity in bicycle design he had his eyes open for other things. In 1997, as part of a class assignment he researched and wrote an article on the state of transportation in China. Bicycles have long been the foundation of mobility in China, but now they are being threatened by the government's headlong rush to embrace the Western model of prosperity. They are closing roads to cycling to make room for autos with their attendant noise, pollution and greater space requirements. ("China Must Not 'Wait Until the Evening': Resisting Mass Motorization's Assault on Bicycles and Mass Transit," Pacific Rim Law & Policy Journal, 1997, Volume 6, p 717.)

This alarmed Adam and after completing the article he decided to find out how to make pedaling a comfortable and practical means of primary transport. He found out about the Leitra from the Encyclopedia Video. This search also revived his long-time dream of having an all-weather pedaled vehicle for his own use. Besides the health and environmental benefits of cycling everyday all year he regarded buying a car a sellout.

He continued his search on the web looking up everything he could find about Velomobiles (a recently-coined term for all-weather pedaled vehicles in general) and discussed it with a several other Leitra owners by email. By March 1998 it turned out that there were 2 choices in the

final analysis, a new design called the Geros CabBike (with standard electric assist) and the Leitra. Since he wanted delivery before the coming Winter commuting season, which was only 6 months away at the time, he opted for the Leitra because Carl-Georg had a track record of making deliveries on time. Geros was new and hadn't made any deliveries yet. Adam's decision was aided by first-hand experience from two other North American Leitra owners via email discussions.

■ Buying the Leitra

Making the decision was one thing, getting it home was quite another. When he checked into freight prices Adam found that it would cost more to ship the Leitra than to fly to Copenhagen (\$650), take delivery in person and pay an extra luggage charge (\$200) to bring it back on the plane with him. Since the 1998 Velomobile conference was being held in nearby Roskilde at the same time, it was an easy decision to make. On arrival Adam found an excellent public transit system and systems of bikeways that provide access to everything, including the airport. During the entire visit it wasn't necessary to use a car for any trip.

It turned out that taking delivery in person was a very good idea. The Leitra is custom-built to the rider's size (there is no adjustment in the seat position) and being there for measurement guaranteed that the custom fit would be right. Carl-Georg permits, and even encourages customers to do some of the final assembly so they will be better able to manage any repairs and replacements once they are far from the factory. In addition there were several "bugs" to work out that were easily solved at the factory.

Standard equipment on the Leitra included full suspension utilizing carbon-fiber leafsprings and a lightweight welded-truss steel tube frame. The fairing is a full fiberglass shell with top sections that tip up easily for entry and exit and can be removed quickly when necessary. The windshield wraps around the sides for a wide field of view. Most of it is polycarbonate but the frontmost section is a piece of glass with a hand-operated windshield wiper. There is a small luggage area behind the seat. On recommendation he had optional disc brakes, lift-off rear fairing, and wheel pants added. The disc brakes are actuated through a splitter that permits one lever to operate both front brakes. The rear brake is a caliper and is best used as a parking brake. It doesn't offer much stopping force when you are moving.

The two major options that Adam considered, but didn't get, are the Florian Mountain Drive for greater gear range and an electric motor assist (the ZAP DX which has been fitted for one customer). Although it might be recommended in a hilly area like metro Seattle Adam decided to see how it went without them. Once the Leitra was safely back in Seattle Adam took it to Electric Vehicles Northwest in South Seattle to beef up the electric system for the long wet Winter commuting in Seattle. They added turn signals, a stronger headlight and a bigger battery. During the first few weeks of riding there were some minor bugs to work out and one major one. A fluid leak developed in the brake system so it was shipped to Hope in California for repair. The minor problems have been squeaks and rattles. Bikesmiths, a shop in Seattle, has fixed those. One thing about taking the Leitra in for repairs is that there is no problem finding someone enthusiastic to work on it. It also tends to bring out other excited people who dream about being able to go anywhere under their own power at any time of year.

■ Riding the Leitra

Here is how Adam describes a commuting trip from his urban Seattle home on a typical day. The Leitra is parked in the carport, where there is a place to lock it securely. (Ironically Adam's car is parked out on the street.) The pre-ride check consists of unlocking, checking the tire pressure and installing the battery, horn and stereo. Then he's in and

away in about a minute. A rough and steep driveway leads out of the apartment complex. The Leitra's full suspension handles the bumps easily—it is quite rugged in spite of its delicate appearance. Around the neighborhood people have gotten used to seeing the bright yellow Leitra, but once he's a little further from home Adam encounters cars honking and stopping, people cheering—it's a little like being a celebrity. Seattle has a large and enthusiastic cycling crowd and fairly accepting car drivers so there hasn't been a single hostile comment from any drivers.

With all the amenities for winter riding, including radio and cellular phone, the weight of Adam's Leitra has crept up to 80 lbs. He doesn't have any trouble with this, even though there are 4 substantial hills on his 12 mile (RT) commuting route. With a trike you can slow down as much as you need going up hills. A persistent problem once underway, however, is that the windshields start to fog because of the trapped body warmth and moisture from exercising. Adam uses anti-fog treatment on the windshields but this hasn't been a complete cure and so he is adding a fan (connected to the battery) that will improve ventilation at low speeds.

Once arrived Adam always gets questions from onlookers while he is parking, the most common being "How fast?" and "How expensive?" Speed is purely a subjective thing and when you are enjoying a ride, as most people do on a bicycle, there isn't a great rush to get someplace so the answer is usually "Fast enough." As for the cost, the \$6700 purchase price and added costs of lights, turn signals and other custom work seem like a lot at first and they are. But when you add up all of the maintenance, fuel and insurance costs of a car the Leitra pays for itself in a few years. (The Leitra is insured under homeowners' or renters' policies.)

Adam does keep a non-polluting CNG car for times when he needs it (he figures he puts about 2500 mi/yr on the car compared to 5500 for the Leitra) but he uses it less and less as he gets more comfortable with the Leitra. Adam often makes his commute twice a day, and then sometimes goes other places in the evening for a daily riding distance of up to 40 miles. There is a good feeling about getting around under your own power. You're just trying to get someplace and doing it in the most efficient and least harmful way possible. Just like with any custom-built vehicle you have to learn to do more mechanical work yourself and knowing how to do that adds another degree of satisfaction.

■ The Future

Currently only about 30 Leitras have been sold in Denmark. Most, by far, have sold to German customers. For this reason Tobias Enke has discussed setting up distribution for Leitras in Germany so they can be more available worldwide. If this goes through Carl-Georg will step up production. In the meantime if you are considering buying one for use in the US Adam strongly recommends picking it up in person. Besides the thrills of visiting a country that accommodates cycling for transportation and seeing the Leitra factory, you'll be certain that you've got everything you expected before you leave.

■ Summary

The Leitra is a practical all-weather HPV that you can use like a car and

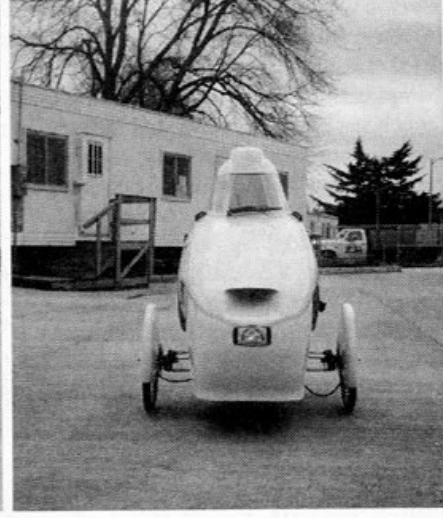
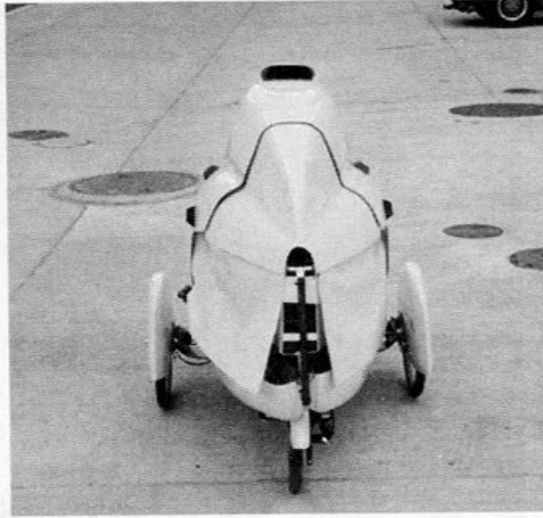


Adam Karp and his Leitra—photo courtesy of Nick Hein

offers greater utility than any other similar design, of which there aren't many. Just before this article went to press Seattle was hit with a severe windstorm that was knocking down trees and blowing cars off the road. Adam emailed that his commute in those conditions was fine and he now feels that the Leitra can handle any kind of weather.

In addition Leitras have a nearly 20-year history of satisfied customers with millions of miles travelled on all kinds of roads in all weather. For these reasons it sounds like the solution for anyone who wants to give up complete dependence on cars. And it might be, but there are some things to be warned about. There is some time and effort involved with getting one and there will be some time getting used to it initially. Even after you've owned it awhile you will probably still need a car for trips where you take passengers or need to carry large loads, unless these trips are infrequent enough that you can rent when you need to.

So if you need to you can find enough rational justification for owning a Leitra. But the Leitra (or any other all-weather HPV) is more than a money-saving exercise machine. It gives a feeling of self-sufficiency and peace of mind while you are going places. There's time to think and look around instead of just rushing through. Most of all, the attention and excitement it creates when people see it inspire hope that we can someday all get around more cleanly and efficiently. This wasn't meant to be an article on how we can and must stop the irrational auto



LEFT: The Leitra is truly one of the most ingenious recumbent trikes made. Note tilt front end; CENTER: Leitra from the rear; RIGHT: Leitra front—Nick Hein

culture, but once you've ridden a Leitra it's hard to think of anything else.

■ Importing a Leitra

- \$4800.....Chassis & fairing.
- \$1200Options: Hope disk brakes, fenders & rear lift-off fairing,
- \$900.....Crating & airfreight.
- \$500.....Installation of halogen headlight, LED, turn signals, fan,
battery box and other incidentals (done by EVNW).
- \$100.....Bikesmith Bike Shop for improving the windshield
wiper; installing an air horn, cell phone mount, and
quieting down vibration noises.
- \$15.....For installation of AM/FM/CD with speakers.
- \$7615.....Total.

■ Components

Rigida rims; SRAM Sachs 3x7 rear hub; Dia Compe rear brake; Thun crank; Wellgo pedals; PG chain; carbon fiber suspension; steel frame; aluminum extensions; carbon fiber QR seat.

■ Access

Leitra APS
Copenhagen, Denmark
FAX: (011)45 48 18 33 77

■ Web Sites

www.pw2.netcom/~karpeter/Leitra.html
www.users.cybercity.k/~dko6800/leitra.htm



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The 'Bent Cost Factor

by John Riley
johnriley1@home.com

A thousand dollars? For a bicycle? What, are you nuts?!... Chances are, if you ride a production recumbent bicycle, you have heard a comment like that at one time or another. Perhaps it was your own reaction when you first heard how much recumbents cost. Maybe you have been thinking about getting one, but still feel that way about it.

It is bad manners to ask how much something cost, unless one is considering a purchase, but it is also quite common in the case of anything exotic. If you drove a Ferrari, chances are strangers would ask you how much it cost and how fast it went. Recumbents are that exotic to some people, so the issue does come up a lot.

Why do recumbents cost so much more than regular bikes? Well, volume, for one thing. The US market for regular bikes might be 10-15 million. Knock three zeros off that and you will be around the annual US market for recumbents. Also recumbents are more complex; consider the seat, for example. Prices are coming down as volume increases, but this is likely to be a slow process. The returns on investment in the bicycle business are nothing like the potential returns in other types of businesses, so recumbent makers probably don't have a lot of capital to work with. They will have to grow slowly, re-investing money as they make it. They may not even be able to keep up with demand.

It must be said that for some people, \$1,000 is a lot of money, period. These people might want to consider a used bike or a homebuilt. But for many people who claim that \$1,000 is too much for a bike, \$1,000 is not a lot of money. A lot more than this falls on the floor and goes out with the trash every time someone buys a \$50,000 sport utility vehicle. These vehicles have far higher profit margins than cars. Yet people don't say, "\$60,000 for a truck?" they just say, "I'll take it." So strictly speaking, there are many more people than the ten thousand or so who buy a recumbent every year that could afford one.

When this subject came up on an internet discussion list, people said, "Yeah, but it is a relative thing. Relative to regular bikes, recumbents are really expensive." Relative to cars and minivans, sport utilities are a lot more expensive too. I think the point is that people perceive the sport utility to be worth the difference, even if it is only on the basis of image. For some reason, when people look at recumbents, they don't make this kind of leap. They don't perceive added value the way the buyers of sport utilities do.

In many cases the opposite may be true. Instead of seeing the added value of a recumbent, it may actually be less attractive to them than a regular bike. Many people regard recumbents as "weird" or "funny looking." Even if the potential buyer does not personally see them this way, chances are they will factor into their decision the fact that many people who see the bike will perceive it in that way. Rather than projecting a positive image, the recumbent may be perceived as projecting a negative image. I have suggested in a previous article that it might be possible to affect this by paying more attention to the style of the bike. In any case, with existing designs, it remains an issue. When people express shock at the price, it may not really be the price at all, but just an easy way to express a negative gut reaction. They may really



BikeE's \$650 CT

mean, "That's a lot of money for a bicycle, especially one that weird." It is the opposite of the "gotta have it" reaction people have when they see something they really like.

This perception problem is very unfortunate because recumbents have tremendous value potential on several fronts. A good many of those \$100-\$300 conventional bikes spend a lot of time gathering dust in the garage. They might occasionally get carted off to the local bike trail on a sunny Sunday afternoon. For many bikes, that may be it. Chances are, those rides reminded the rider of the discomfort of riding a regular bike, and served to discourage them from doing anything more ambitious. If a bike was only used this way, it would not make any sense to spend \$1,000. Maybe some people who object to the price can't get beyond this notion of what a bicycle is useful for. They look at a recumbent and see, "weird." They don't see, "Hey, I bet I could sit on

that thing all day; I could ride it to work, get in shape, save money, go on a tour."

Perhaps many of us that do ride recumbents saw something like that. In my own case, I bought my first recumbent in 1982. I was a cyclist, but not a happy one. I was living in Iowa and wanted to do RAGBRAI, but it was painful for me to spend that much time on a regular bike. I spent something like \$1,700 on an Avatar in 1982. Yes, it was "a lot of money for a bicycle" but it was so much more than a bicycle. It transformed my life. It gave me a useful, healthful activity that I could enjoy for the rest of my life, an activity that has been a mental and physical constant through a lot of ups and downs (mostly downs) in my so-called work life.

I think everybody should have this kind of activity in their life. I think recumbents go way beyond bicycles in their potential for this sort of thing, if you consider the whole population. Bicycles are good, and lots of people have a lot of fun on regular bikes, but for those that don't, recumbents can really open up a whole new world.

So if you can afford a recumbent and are thinking about getting one, but still think, "It's a lot of money for a bike," think about where you want to go. Will a recumbent get you there better than a regular bike? What is your real reason for buying a bike? Are you looking for more than a garage dust catcher? The price just means you have to be more careful about answering the questions; it doesn't mean it is not worth it. Do as much test riding as possible to see if a recumbent will meet your needs and to see if it will go beyond being a garage dust catcher for you.

Other things being equal, a lower price is always better than a higher one, but ironically, in the world of recumbents, you may find some of the most satisfied buyers, people who think their bike was worth every penny, among those who paid the most. A recumbent isn't for everybody, and not every recumbent rider needs a Tour Easy or P-38, but if you listen to riders of expensive machines like these, you can learn a lot about the real potential and real value of a recumbent.

In any case, if you do take the leap, you will probably still get rude questions from strangers. But stay tuned. With any luck, those questions will go from, "How much did that thang cost?" to "How do you like your recumbent?" or "Is that a Rans?" □

Charles Mochet and The Velocar

by Georges Mochet

French-English Translation by Nola Fetters

Intro by Francine Mochet

Liaison and historical consultant Emmanuel Delannoy

Story idea and original letters/questions by Dave Stephens

Photos courtesy of Georges Mochet and the Mochet family

Photo prep by Dave Stephens and Mark Colliton

Editing by Nola Fetters, Dave Stephens, Emmanuel Delannoy, Bob Bryant and Paul Arends

How This Article Happened to be Printed

by Dave Stephens

The internet is a great thing. A year ago on the HPV list which I had just discovered I met Paul Clark. Paul and I corresponded about recumbents, his passion being home-built recumbents. I had been riding my Linear for 5 years at that point and during our emails Paul sent me a picture of a "Velocar." I was completely blown away; here was this beautiful machine, looking very modern by today's standards but was built in 1932! I had never known that recumbents had really started commercially in the 30's and not in the 1970's by a few geek cyclists.

This discovery started me on a mission of inquiry. Paul later emailed me an old article from *Cycling Science* by Arnfried Schmitz about the history of Charles Mochet and the Velocar. The story is right out of Hollywood; the good guy builds a better mousetrap and the evil power-mongers squash any chances of superior technology ever succeeding in the mass market. I searched book after book and all over the internet and could find no further information on the subject.

One day a friend informed me that the Alta Vista search engine had a new translation feature so I did a search on French sites, hoping to find the location of a real Velocar so Paul could make plans to build a replica. Very surprisingly in Mochet's own mother country there is virtually nothing about the Velocar anywhere. I found one mention of it on one HPV site. I found the author's email address and held my breath and wrote a letter in French using the translation engine asking for information on the location of surviving Velocars in any museums over there. Emmanuel Delannoy wrote me back in English, fortunately, and said he knew of one nearby and said he too was passionately interested in the Velocar's history.

After several emails Emmanuel said that Georges Mochet, Charles' son, lived nearby and if I could make a list of questions he would contact Georges for me. So I made a list of what I thought were semi-intelligent questions and emailed them over. To make a long story short, Georges mailed photos and a complete manuscript of the history of the Velocar in great detail, something I had never expected and was overjoyed to finally get the real "inside" and complete story of what had happened back those many years. This story you're about to read exists in no other book or publication, this is the first and true story of the TRUE PIONEERS of recumbency....

That Man on his Funny Machine...

As preface, this article by Francine for HPV France, that expresses humor, poetry, tenderness and love.

by Francine Mochet

Translation by Nola Fetters

Saint-Aygulf, Côte d'Azur, France. Our precious tourists have braked their motors in the heat of the endless traffic jam of family cars headed toward the beach. And they see passing by, tranquil, laid back, relaxed, a man seated in a long blue vessel, his feet barely visible pushing the pedals: he seems to slip through the air, to cut through the wind. The children clap their hands, the tourist-photographers snap their shutters. There's a special souvenir to warm the coming winter.

But after the follies of summer, calm returns to this little coastal village of Var; and our little community is well acquainted with the ever-young retired 77-year-old Georges Mochet—to such a point that he once

received a letter from the United States which bore simply for address the name M. Mochet and a drawing of a recumbent bike.

He has constructed several models of recumbents, eventually filling two garages with prototypes—two wheelers, three wheelers, and four wheelers. Each planning process is long and full of revisions, but always put into effect by using the simplest solution, because Georges Mochet is an engineer but also an impatient handyman; and, in his opinion, simplest is most beautiful. Though his monetary resources were limited, Mochet managed to participate in expositions abroad, where his designs were lauded by technicians, fueled by the dream of proving that his "vélo-horizontal" or "horizontal bike" could be a touring machine with a comfortable seat in order to rejoice in meandering through the country or simply setting off to buy a newspaper.

However, if enroute he overtakes a gaggle of cyclists all decked out in every latest accessory, a bit sarcastic about his laid-back position, he is quite capable of a sprint which leaves them in the dust. Only after such a demonstration do some of them deign to ask about a few technical details, which are furnished with enthusiasm, conviction, and pleasure. To those who press for more information and who are pleasant, he will even go so far as to take out the photo of his son on one of the Mochet recumbents. The latest model is naturally the one he finds most satisfying, but is already thinking about the next one.

However, he claims, "After that one, I won't make any others." But can such eternal youth be chained?

HPV RACING HISTORY AND THE VELOCAR

by Georges Mochet

DEFINITION HPV's (English abbreviation for Human Powered Vehicles) or "Véhicule à Propulsion Humaine." These are faired bicycles, tricycles or quadricycles whose elevated speeds surpass by far that which is possible to do with a so-called "normal" bicycle in its racing version.

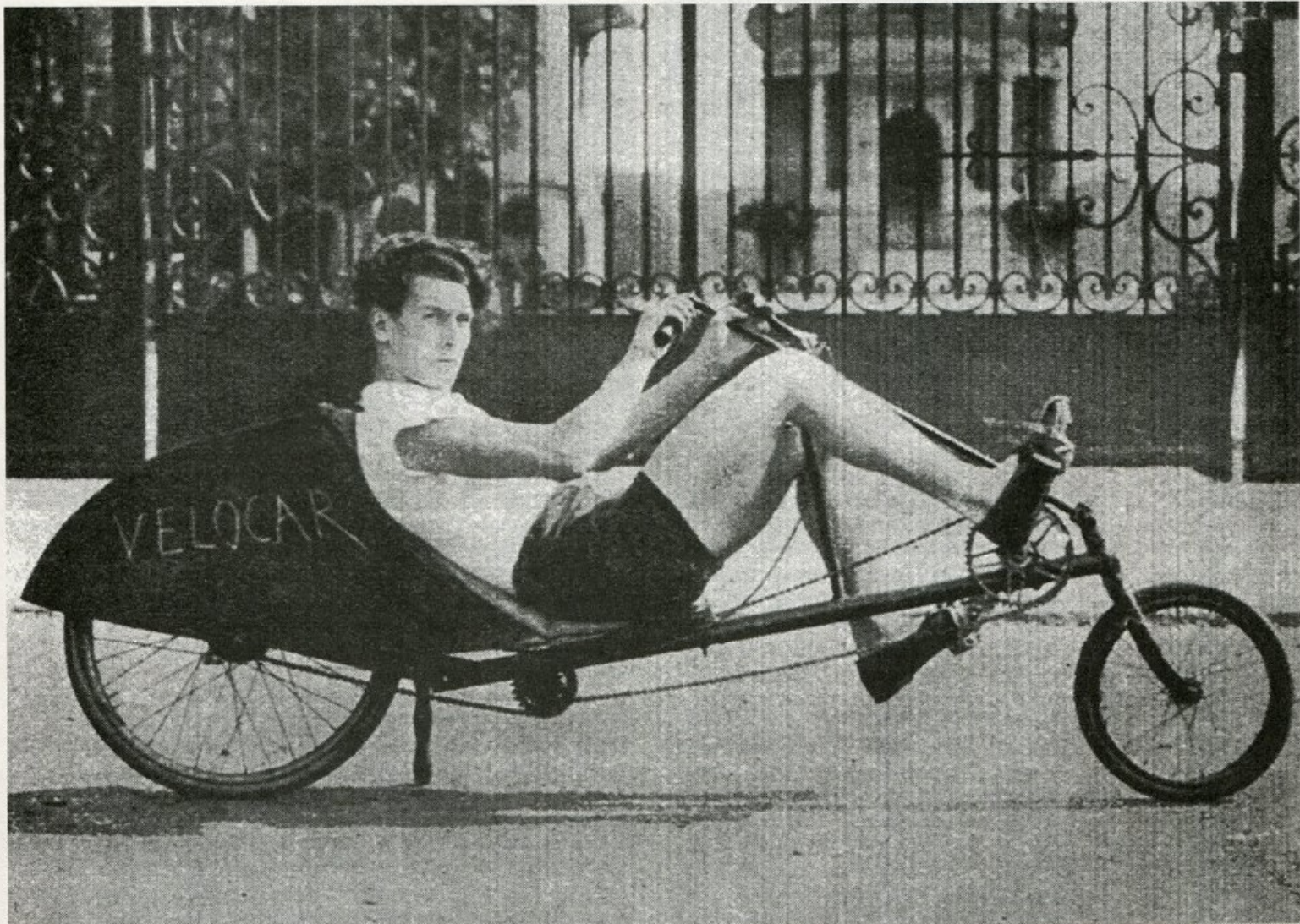
FORWARD This is meant to be an objective examination of the possibilities of vehicles whose pilot is the motor.

The most known is the classic bicycle which, possessing many qualities, is far from being the most efficient vehicle when it comes to speed and comfort. A certain number of rules common to all these vehicles will be discussed and explained. They will be surprising because, while elementary, they are unknown by many and sometimes go against false dogmas and widespread prejudices shared by the public and by the cycling world.

■ Chapter One

It is necessary in order to understand the motives which led me to make this study on cycles or HPV's in general, and also in order to justify a certain competence in this area that I begin with a quick biography—one that must begin, however, before my birth.

My father was an inventive and curious man, with a taste for research. He was an "inventor" in the true sense of the word. I know little about his early life; I know only that, around 1910, he was trying to manufacture "aéroplanes" in a workshop located in Marseille, France, along the Corniche, in a neighborhood called les Prophètes, or the prophets. I have a photo of his workshop during that period. He was corresponding with Santos Dumont at that time, but unfortunately the letters have been lost.



The first Vélocar designed to be faired, its great speed the reason a series of 1200 machines more or less like it were eventually produced. The efficiency of this bike was so great that plans for a fairing were temporarily put on hold and we decided to try to officially beat the cycling speed records and gain sanctioned confirmation

Shortly before the war of 1914, my father left with my uncle for Morocco, in order to set up a transportation business. There, he became interested in automobiles; and he and my uncle participated in a race called le Circuit du Maroc, my father in a De Dion Bouton car and my uncle in a car called the Meziane, which was manufactured by the brothers. During the war in 1914, my father had even manufactured a little four-wheeler with an alternating pedal system which was used in Casablanca.

But my father's obsession was valveless engines, which led to his return to Marseille, France, in order to put to it the finishing touches and fine tuning. It was an engine with rotating lining and a conical combustion chamber. (Later, during the World War II, the Hispano company produced an airplane engine which used that design.)

This engine, mounted on an Austin, proved satisfactory. My father made several Marseille-Paris trips, and that's how the family found itself in France's capitol.

In addition to the engine, which was to be installed in Vinot-de-Guignan automobiles and which was in its prototype stage of manufacture in the factories of Nanterre (later Simca, later...) my father was working on commercial production of a shock absorber called Amortichoc and initial studies for a light car, or voiturette, the 4HP CM (for Charles Mochet). The generosity of a friend, a former hairdresser, who gave my father the use of his shop building, across from the Japy gymnasium, in the second arrondissement of Paris made possible a place to construct a prototype of this voiturette.

From Boulevard Voltaire, we were to move to St-Ouen, where an old wine distribution building became our residence and the "factory" from which were eventually turned out 120 to 130 4 HP CM's, two-seaters,

each equipped with a 350cc two-stroke engine.

In 1923, there were evidently financial difficulties of which I, only a small child, was unaware. For me, all was well. I was attending school near the city hall, I was playing with my buddies—all that was lacking was a bike. I nagged my parents unmercifully, but my mother wasn't having any of it—she was afraid I would be hurt.

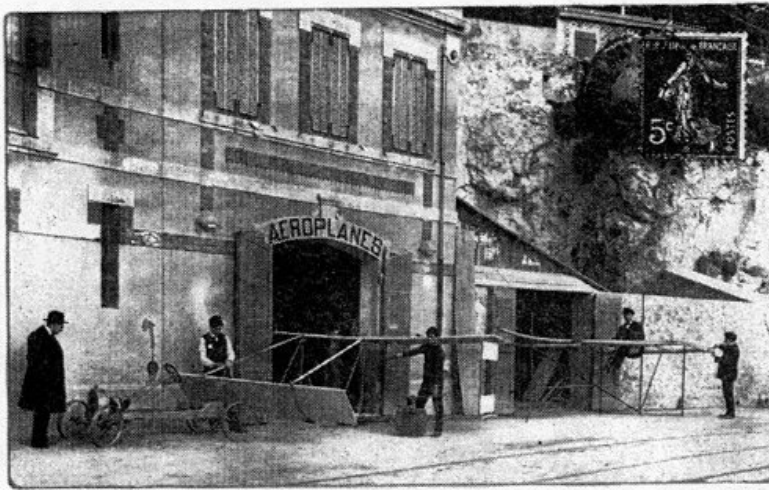
However, my father, by reducing the parts and weight of the voiturette, made me a real quadricycle, with two seats. It worked with alternating pedals and it worked great.

In order to change speed, I just changed the fixing point of the chain on the lever and I could go up any hill. The normal way to work the quadricycle was to pedal alternatively; but the pedals could also be pushed down at the same time, as there were return springs. I don't know what became of this vehicle, nor why, during the development stage of a new 500cc engine another one-seater prototype was built for me (see a 1925 picture of me at age 11, seated in the foreground).

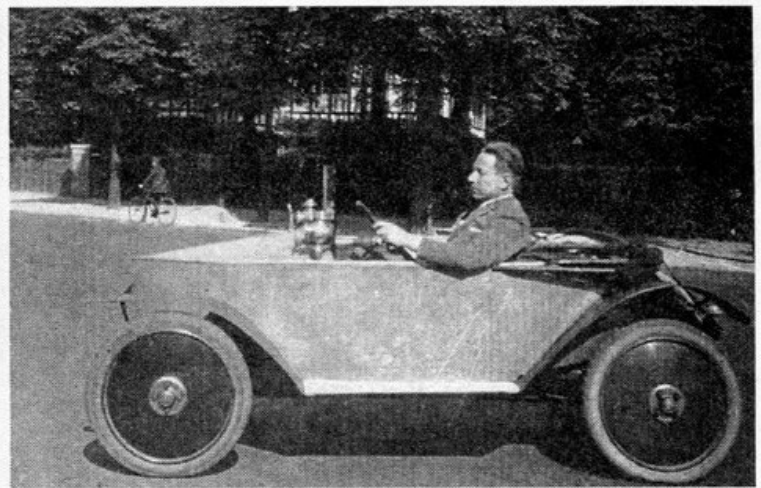
A sad memory—the day I was to test the one-seater, it rained all day long and, since the paint was not quite dry, the maiden voyage had to be postponed.

It was wonderful (see the photo of 1925 taken in front of the Hippodrome of Longchamps with two brothers). This "vélocar" or "bike-car," because that was the name that my father, after due family deliberation, had given it, was light and swift. I was very proud because I could go faster than my friends on their bikes. We thought it was due to good pedaling position and great aerodynamics of the body. I used it for several years; then it was sold because making and selling Vélocars had become our trade.

Just for fun, my father had also constructed a two-seater. It sold



Charles Mochet Factory/workshop circa 1910 at the Marseille location on the Corniche.



Chassis of the first 4HP CM (Charles Mochet), circa 1920, Monsieur Charles Mochet with one of the first 4HP CMs in front of the hippodrome of Longchamps, circa 1920.

easily, so we manufactured and sold more—at first one a week, then one a day. Because it wasn't as profitable as other products, bike-car production was suspended (nominally—because obsessions are never permanently abandoned). After we lost the lease on the Saint-Ouen shop, an architect friend of my father pushed him to buy property at Puteaux and to build a workshop. Later, my father's friend built a country house nearby and his daughter eventually became my wife.

The period from 1925 to 1950 saw production of approximately 6,000 of these little pedal-powered quadricycles. By the 1940's an increasing number of them had electric power or engines added, some by handymen, some by mechanics especially during the Nazi occupation. By 1945, we produced engine-powered quadricycles. These vehicles, with both pedal and motor power were very handy in our poverty-stricken post-war period when regular cars or trucks of any type were scarce. The later models, manufactured between 1957 and 1960, were really little cars, the pedal feature having been eliminated.

Here temporarily pauses the story of the four-wheeled "Vélocar" which will be taken up again in a more technical and complete form, as well as that of the 4HP and the little Charles Mochet cars, because our focus turns to HPV's.

■ Chapter Two: The recumbent—its birth, its life, its end, its survival

On a wintry Sunday in 1930, my father, my mother, my cousin Alexandre and I were gathered around a table at an auberge in Nonencourt—in such a setting ideas are often born.

The conversation centered on the performance of the "Vélocars." We had noticed that on flat ground two good cyclists in a Velocar could go faster than a tandem, which in turn was faster than a bicycle; and we were wondering about the reasons for this superiority. The Vélocar was at that era a pedal-powered quadricycle. It had a lightweight body, pointed in front, but at the same time enveloping the rider, who pedaled in a seated position. We were in agreement that back support for the rider allowed a considerably greater pushing force on the pedals, superior to that of a conventional cyclist pulling with all his or her strength on the handlebars. But back muscle force didn't explain everything. Force is one thing—that's muscle power—but the power and the work produced are unique to the heart, lung power, and general physical shape of the cyclist. So the air drag had to be important.

At the end of the conversation, we agreed to construct a fully faired tricycle, using parts from the Vélocar, in order to use its proven performance as a publicity advantage and make for a salable product. By the following month this prototype tricycle (two wheels in front, one behind) for which unfortunately no documentation remains, had its seat 30 centimeters from the ground, with the crank set at the same height. It was equipped with tubular tires and its framework was reminiscent of a glider's fairing. It was an HPV even before the term existed.

The first trial run was made simply and efficiently. A classic racing bike weighted to the same total poundage as the faired prototype, all tires inflated to the same pressure of 6 kilograms, was used as control. The bike

rider was instructed to take the most aerodynamic riding position he could, "hands below the bar." The two vehicles were taken to the top of the coast of Picardie, along the route from Versailles, and each took off at the same moment. The prototype had arrived at the bottom before the bike had even reached the halfway point. Such a trial made manifest the aerodynamic qualities of the prototype because the rolling resistance was the same for the two bikes. The one that went faster was the one with the least air resistance.

Further trials on roadways and around Longchamp using one of our young workers as driver only confirmed the potential for greater speed with this faired tricycle.

We progressed to racing-track tests. The track chosen was at Saint-Denis because of proximity. It was a 250 meter cement track, very similar to that of "Vel d'Hiv"—a famous track of the era. This was less successful, because the curves were steeply banked; and the tricycle had to brake too sharply into the turns, unable to get up any speed until through the turn. Solution—the consensus was to go to two wheels. No sooner said than done, and in photo sheet four you can see the result of the first racing horizontal bike.

The rider of this two-wheel version retained the same position as on the tricycle (a position almost universal in HPV's since, whether with two, three, or four wheels).

Before fairing the bike, we decided to let the rider get used to how it handled (he was able to ride it immediately) and to try it out on the banked turns. It handled perfectly. It was moreover immediately evident that its speed was clearly superior to that of the classic bike, since many cyclists were using the track at the same time and none could overtake this prototype, which was given the term "horizontally-pedaled bike" by the press. There were other experimenters with crank sets set more or less high in front of the rider contemporaneous and previous to the Mochet prototype, but these variants were undertaken with the goal of increased rider comfort. In contrast, the horizontally-pedaled bike Mochet, which was also called the VV because of its Vélo-Vélocar origins, was the first to show a true performance gain over even the most advanced racing bikes of the time.

With this goal in mind, we constructed several Vélorizontals for race training, one of which was ultimately used in competition by Francis Faure. These bikes were in strict conformation with the defining rules of the U.C.I. (Union Cycliste Internationale) and the U.V.F. (Union Vélocipédique de France), later to become F.F.C.

■ Preface to the Records

Before hiring a professional racer, trials and refinements were in progress around Longchamp on a road located near the Hippodrome, chosen because it was a popular road for training both by serious amateur cycling enthusiasts and by professionals. Participants in these trials were the young Lucien Brillouet and later on a Monsieur Henri Martin, one of our Vélocar clients who had subsequently come to work with us. Then 17, I sometimes participated as well when my studies would permit, because I

was working for admission into France's top universities.

Lucien Brillouet achieved a good performance on May 20, 1932—making an average of 44.222 kilometers per hour on the Longchamp road in rain swept, soggy ground—pretty spectacular for a mere amateur, not even into tour cycling nor even regular bike commuting. Upon this achievement, taking himself for a natural-born champion—because he felt he personally was the only factor in his performance—he bought himself a racing bike and, quitting our employ, joined a cyclist club in the hope of making a career of bike racing.

Now we come to Henri Martin, a key player in the Vélorizontal adventure. From the very beginning he was an ardent fan, very attached to my father; and to him I was affectionately known as "Jojo." One or two months before Francis Faure, Martin officially beat the speed record for the hour on the St-Denis track and was very disappointed when Francis Faure was eventually chosen to try for the official record-setting performances. Martin participated in several bike-touring competitions, including the Chanteloup coast race and a competitive Pyrenees tour through numerous mountain passes which took place annually, foreshadowing the Tour De France. Martin left us in 1936 in order to market a recumbent bike of his own design whose wheel was located between the crank shaft and the cyclist, with the rear wheel in the classic position. (Editor's note—the first SWB recumbent?) He sold this invention to the Ravat Wonder company and established a bike store in Paris near the Arc de Triomphe, selling the Ravat range of bikes, including Martin's model. During the Nazi occupation of France, Martin had a sidecar made in order to carry provisions and to transport food to and from his country friends. Afterwards, he tended bar at the Ballon des Ternes, following which he moved to the city of Oléron. The first post-war production of recumbents in America closely resembled the Martin model.

As for me, whenever possible I would ride the Longchamps course with or without Martin and Faure when they were with the company. The standard tactic was to ride together, overtaking a group of cyclists who were at best ignorant and most commonly contemptuous, attempting to leave us in the dust, whereupon we would easily outdistance them, only to come upon another group and replay the scenario. This would recur an average of three or four times on the 3.635 kilometer circuit. After a few of these encounters, we felt we deserved a little rest.

The impressive results of our trials did not escape the attention of the sports press, those who covered the vélodromes as well as Longchamps, center of professional cyclists. Following are a few extracts of articles appearing in the press at that period.

l, Echo des Sports, October 13, 1932: "All the papers have related the exploits accomplished by the race model Vélocar by a young newcomer at Longchamps officially timed at 4.55 in spite of the rain. Since this same cyclist on an ordinary bike was timed at 5.50, it must be admitted that Monsieur Charles Mochet's machine is responsible for this greater speed." *Paris-Soir*, same date: "This morning, the young Castelain made a new try on the Longchamp course, on his Vélocar with its recumbent riding position. Castelain goes so fast that no other racer can match him. All were

overtaken's the racers Gérardin, Maronnier, Beyle, Maréchal, Blanc-Gurin, and Vallée witnessed the performance."

Sporting, October 17, 1932: "In order to respond to the doubts of his clientele, who don't fully understand how his Vélocar works, Charles Mochet has manufactured a two-wheeled bike which uses a seated pedaling position and a backrest, allowing the use of the back to considerably augment the force of propulsion. Thus an average cyclist gains speeds comparable to those of classic racers currently on the Longchamp course."

Science et Monde, October 27, 1932: The article having been illustrated with a photo of the first Vélo-Vélocar ridden by Brillouet, we have included a photocopy.

l,Auto, October 16, 1932, Le Salon du Cycle: Une revue technique "During our daily visits, we have spent some time by the Vélocar stand, not able to attach the term of bike to this unique four-wheeled vehicle. We reproach the builder of the Vélocar for not having shown his two-wheeled machine which does fit the description of bicycle.

Prodigious speeds have been achieved with this new contraption. This gave to Oscar Egg the idea of his bike-rocket...." Egg's bike-rocket did not live up to the hopes of its creator. Oscar Egg was at this era the record setter of the hour, 44 km 247, achieved before WWI. During this period Marcel Berthet and Oscar Egg were in constant competition for the record, but the war put an end to the duel: Egg was the record setter, and it was a very impressive record for this period.

In 1932, Egg owned a cycle store on the Avenue de la Grande-Armée in Paris, a shop known for its beautiful machines. As was common in those times, he sponsored a racing team who participated in both large and small competitions. He was a savvy marketer with a very good technical background. He was well aware that his record would not last very long and that the Vélo-Vélocar or some other cycle would beat it, whether because of technical advances in tracks and machines or because of improved training methods.

He had the idea of attaching a cone (a conical trunk .40m by .80m long just behind the cyclist), thinking that the cone would improve the bike's speed. The cyclist press enthusiastically lauded his many prototypes, attempting to set them up as the opponent of the Vélo-Vélocar. Egg welcomed this tactic, as it only served to keep his company in the public eye and was great publicity. With the exception of one good Longchamps performance by the racer Cornez, who was an authentic champion, the other tests made with Cornez himself and another good racer named Boucheron, nothing notable was achieved. They achieved the same results on the bike with or without the conical "woodpecker tail." (See the entire article in *l,Auto* of October 29, 1932, which reports the trials.)

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■ Look for Part II in RCN#53.

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Recumbent Anthology

Joel Smith of ATP Vision

by Kelvin Clark

Kelvin Clark (KC): Let's start with 1999, Joel. You've got some new stuff going on.

Joel Smith (Joel): The most obvious change was an upgrade in our compact, the 30 has shifted to a new model we call the 32. We found an interesting new location to put the bottom bracket. We moved it farther forward and up. In doing so it improved the balance of the bike dramatically. I think the center of gravity moves a full 10 inches forward between the wheels and so the braking balance is really nice. I was also able to steepen the head angle from, I think ours was 62, but that's now all the way up to 69, getting close to normal bike geometry, and that helped the handling dramatically as well. So those two things in concert just made for a different feeling bike. On the 32 we also upgraded the components. Now instead of the simple elastomer, we're going to be using the more sophisticated Cane Creek AD5 shock system. We're using V brakes on the bike this year. We found that when we moved the bottom bracket location forward and up, performance actually increased. It's one of those fuzzy, subjective things, but everybody said how it climbs so much better than the 30 does. It still utilizes the Sachs 3x7 with a 16/20 combination for wheels. The other thing that we did last year that we're going to include in it this year is that we developed a 16-inch suspension fork so now we are going to be able to use that fork on the bike and turn it into a full suspension bike. Now that the weight balance is a lot better there actually is enough weight on the front wheel that it's very effective because it's such a direct link between the front wheel and the handle bar. It's a real noticeable difference putting the front suspension up there so it just takes the shocks out of the handlebar. The other big change from a frame standpoint is all of our rigid frames, the 20-inch versions now increase the wheel base by 3 inches and steepen up the head angle a couple of degrees. It helps the handling surprisingly. It tracks quite well. So that has been a real nice upgrade. It was a fairly simple thing for us to do. We finally gave into the fact that the demographics of most recumbent riders are larger guys and so I'm just looking at our stuff statistically, we weren't selling many 16-inch bikes so we said if the norm is a larger guy let's optimize a 20-inch frame around him. So we are still keeping our original frame in a 16-inch only frame, and now this new frame is optimized around a 20-inch front wheel. The only thing that was limiting and the reason that we need to keep it to two frames now is that I think that probably about 5'3" is going to be the shortest rider that is going to be able to ride that bike. So we kept the 16-inch wheel version around for a shorter rider which basically they should be on a 16-inch wheel bike anyway so that they can touch the ground because the seat height goes up on the 20-inch front wheel bike.

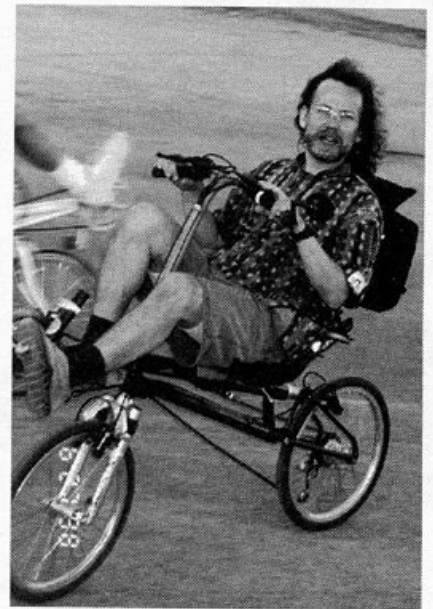
We're getting a lot of really positive feedback. The other thing that we've done is upgraded most of the components on the bikes. We've developed a very good relationship with Shimano, and it allowed us to take the parts that we were using in our R42 and R44 and use those on the R40 now. So that's got RX 100 components along with the STX RC V brakes and Rapid Fire shifters. Then, the upper end, the 44 will now have the new 27 speed 105 group along with LX V brakes and Rapid Fire shifters. That group is just beautiful. The work that they put into the cranks and the derailleurs, bottom bracket, even the hubs is really nice, so that bike really got a nice upgrade. I think that will appeal to most road bike riders who are used to that level of components. They'll be able to step into that same price category in a recumbent now. We've taken a lot of steps this year to make sure that our bikes were targeted towards the performance and higher-end recumbent industry.

We don't want to compete with these Taiwanese-made bikes that most of the other manufacturers are going to be bringing in. The low end is terrific to expand the market, but for us we just want to keep building bikes in the US and focus on design and be able to implement that on our

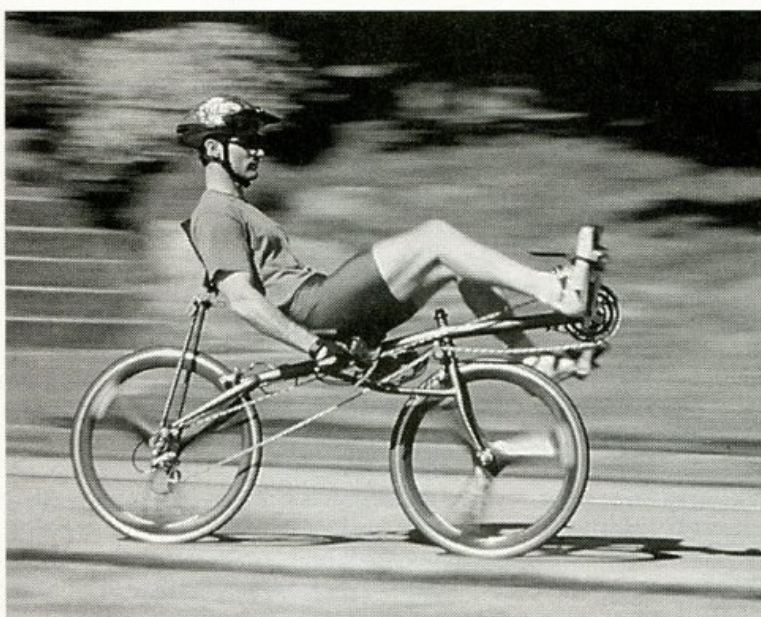
schedule and not somebody else's and be able to control the quality from the first cut of tube to the time you stick it in a box and so we're focused in that direction and thankfully it works well with the other manufacturers who are out there. Everybody is finding where they fit in the industry. I think it is going to help to grow the industry. We're not fighting amongst ourselves, everybody is just trying to figure how they can expand the industry and serve their customers better. The 45 is very similar to last year. It still has the Ultegra group, with the STI shifters. The main change for that one is that we are going to use V brakes on it as opposed to the Ultegra caliper brakes. And the reason for that is that it was just too limiting on the tire selection. You had to use the Conti small tires. That was really the only small tire that would fit in those calipers and even then you couldn't squeeze in a fender and so I decided to go with the XT V brakes this year so that they could put in whatever tires they want and still have room for a fender.

KC: Tell us about your manufacturing facility. The first full year you've had in your new facility?

Joel: We've been in there for just about a year now and at this point we have just about everything except wheel building in house and the wheel building is not in house yet because we just happen to have a world class wheel builder, Winkel Wheel, just 20 minutes away from us. We've had a great relationship with them and that will probably continue. But otherwise we start with raw tubing at the beginning of the day, and within about 4 hours that thing is turned into a complete bike in a box. It goes through all the fabrication, welding, into the cleaning and powder coating and then within an hour it's in the assembly area having the right parts hung on it and in a box waiting to be picked up at the end of the day. So we really can build bikes. We build bikes one at a time. We just look into the computer and pick the next bike that is in line. It doesn't matter if it's an R32, an R40, a tandem. We just pull the work order and hand it to the weld shop. They run it through the weld shop and the powder coating area. That work order follows the bike through the shop into the assembly area. They hang the right parts onto it and stick it on a box and label it up and it's ready to go. It's taken six years to get to this point of being able to build bikes one at a time, and what it took was for us to develop the techniques and to get all the processes in house. Powder coating was kind of the last step for us. Now that we have that in house, we can really build bikes one at a time. That way I was able to throw away my crystal ball and not have to worry about whether we needed to build an extra long red boom next week or not. We just, whatever the customer wants, it just comes through. It makes it easier, makes the production facility look like a hero to sales everyday, because if they need to rush something through for some reason it's not even a disruption to them. It's just the next bike in line.



Kelvin on his Altitude in Creede, Colorado



Joel Smith on his Sabre prototype. Rumor has it that the project has been revived.

It makes it real easy if the shop needed to change something at the last minute. It's not like we build 60 of this color and we only needed 50 of them. We just build what the customer needed. For me, we sell bikes one at a time, let's build bikes one at a time. So we're really excited about that, and this year it is just a matter of refining that system. We're going through and planning pretty rapid growth again this year and so we're going through and improving tooling and bringing in additional equipment or better equipment where it's needed. It's easier to justify more sophisticated tooling and machinery now that the production rates are starting to come up. From that standpoint things are getting a lot easier instead of building a bike every couple of hours building a bike every 20 minutes. It's a lot easier to visualize flow through the shop and have a lot more dedicated equipment for each process.

KC: What's your job description?

Joel: My title is president of the company. I've also been half of the design team from the beginning, myself and Grant Bower. I have set up and overseen the production process since we started the company and do the vast majority of the spec'ing on the bikes. A pretty broad range. The president end of it has more to do with helping to define where we are going, doing the large finance analysis. I do most of the work with the banks, trying to figure out what cash needs are and looking several years into the future to make sure our business plan matches where we want to be and that we have our cash flow needs set, the infrastructure is going to be there for the future. It's quite a challenge for a company that's growing between 50-100% every year wanting to build all of our bikes. Lot of hats. Some of the hats are starting to be dealt out better. I think we are going to be adding some more specific production help. I'm getting pulled a little thinner than I'd like so I want to make sure we have people thinking all day long about how we can make bikes better, higher quality and faster. So we're looking at bringing more help in that area which will allow me to focus more on the design of the bikes which is something that I just do. It's something that seems to have always been an after hours project for designing bikes just because I enjoy it so much. That's something that I'll always do and same with Grant. It's something we enjoy and are good at. The business end of it is fascinating to me trying to figure out how to bring the best out of people. How to make a world class product is real exciting for me.

KC: What did you do prior to bicycles? What was your background?

Joel: I grew up in Michigan, got a Mechanical Engineering degree at Michigan State, was recruited by Boeing to come out to Seattle to work on their 747 as a structural engineer. I did that for 6 years, worked on a variety of projects, 747 fuselage design, 767, they made a cargo version, worked on the cargo door for that, spent some time in the research and development area. I ran a group that was looking for low cost fuselage



Joel Smith on the R32—Photo courtesy of ATP Vision

design for an airplane that would carry a thousand plus passengers. So we were looking at breakthrough technologies for the structural fuselage design. During that time, my personal interest had always been to work and be a significant part of a small manufacturing company. I grew up with race cars in my garage. My dad was a mechanic, race car builder. I used to always love vehicles. The bicycle was the simplest vehicle that I could think of. The first one I built literally was with a hacksaw, grinder and a borrowed torch in an 8x8 wooden shed in my backyard. I had a bucket of water in case I caught the shed on fire with my torch so I could drown it out. So that was always my interest in trying to develop a company that could do that. Some kind of a vehicle and the bicycle was the most elegant vehicle that I could see and the simplest to approach. So that was how I got started. I think I designed a trike in high school and got it mostly built before I left for college and then about 4 years into Boeing I developed another trike. That's how I met you the first time. We built Moulton wheels with Phil Wood wheelchair hubs and that was a fun project, got me started. That's how I met Grant. He was also working on a trike project at that time for his brother. After that I got interested in the two-wheeled stuff that I could actually start a company with, that's where the R20 came in and then started to find out what it was like to have a little business. I sold 34 R20's and about that time Grant and Greg Bower approached me about maybe trying to do something bigger than what we could do by ourselves. That's where Advanced Transportation, Inc. came from. We kept the name I started, incorporated the company and helped to split up the duties a little more and approach this thing as a real business as opposed to kind of a garage business.

KC: Where did teal come from? That goes back to the R20!

Joel: It sure does. Teal at the time was, we had to pick one color that would appeal to, at least not be offensive to a man or woman. It turned out that teal was one of those colors. Men loved red, and women didn't like red, so teal turned out to be, it was not anyone's favorite, but it wasn't a color that anybody hated. That's a fairly lukewarm marketing strategy, but at the time that was the best one we had, so that was where the teal started and amazingly enough when we started the R40 we looked at 4 million colors, brought in color consultants and all kinds of things, and couldn't believe it, we still ended up using that same teal. We tried to start over and we still wanted to have just one color to keep it very simple for the dealers. You only have to stock one color and for us producing only one color and I was the most surprised out of everyone to see that the teal was what everybody still thought was the best color. So that's where it came from. I think it may finally fade away in '99, that color is going away and I think it is a nice time to let it go. Now we have two or three colors in every bike so we don't have to try and pick a vanilla flavor that will work for anything. So now we can be a little more specific to have colors that will appeal to different demographics.

KC: Northwest culture? You're from Michigan, you're transplanted to the Northwest. Has that played any part in anything?

Joel: It's amazing that before I even got to Seattle that I had any interest in the bikes and human powered vehicles stuff, but for reasons that I'm not completely sure of, there was already a nice well defined group in the Northwest that had an interest in alternative human powered vehicles, and I don't know if it's just that there is a fairly high tech culture out there with Boeing and other aerospace stuff along with the beautiful scenery and bike friendly area that Seattle has and Portland as well. It combined well with the west coast culture to want to try some alternative things, but it sure has worked. There have been a lot of people from the Northwest that have been significant players in the human powered vehicles and recumbents in particular. It's been exciting to see people who had common interests and are starting to be able to build real businesses and provide good quality jobs and change the bike world in our own little ways. It's been exciting to see everybody succeed and find their place. It's just that we were tinkering. I remember the first show that I went to—the IHPVA Speed Championship races in Portland, Oregon in 1990—which is a good one, lots of people there that had some nifty products and now there are some that are actually able to make a living at it, that is real exciting for us and for a lot of people.

KC: We talked about this being sort of a turning point year. What does that feel like?

Joel: It's exciting. The first few years, everybody has been growing at a pretty rapid pace, but the mountain bike industry was riding along so well that there wasn't a lot of incentive for bike shops or the media, for that matter, to have a lot of interest in recumbents. They were all riding a pretty steep wave and every year they had their 30% growth so there wasn't a lot of incentive to try anything new and different. But now that has kind of tapered off, people are starting to look out a little bit. For years, you just never saw the word recumbent in a mainstream bicycling magazine and now there have been a few articles last year and this year there have been several. We have had the (now, former-ed.) editor of *Bicycling* magazine out in our facility. We've taken rides with him. We've had nice conversations with a number of other people in the media and they are all starting to try it. In fact, Geoff Drake has been riding a recumbent for a while and it was for the classic reason a lot of people shifted. He hurt himself and wasn't comfortable riding his upright, but he commuted to work everyday and so he was forced into taking a serious look at it and so he's gotten a little more open minded to it. The media in general have just been looking for other things. I think they are just kind of burnt out about just finding out if there is another half inch of travel in this year's downhill mountain bike. The thrill has kind of passed on that and everybody is still kind of looking for that elusive way to attract the baby boomers. We've always known that that's what these bikes do and I think that they are just starting to discover that. With the media starting to pay attention, and that's just everybody being around enough to not just look like a garage clutter, but a legitimate business. There was thankfully a number of us whose timing was very good that we could figure out how to run a business and how to build a product while things were still just incubating so that now that things are starting to pick up, everybody is in a good position to grow and become a legitimate player in the future. Things that are happening this year in particular with the press getting excited about them to some degree and Trek showing some legitimate interest, BikeE trying to expand the market by having their bikes made overseas so that they bring them in at a lower price, RANS helping out their production problems by going overseas and on some of their bikes pushing the price point down which will expand the market. I think this is a good year for them to try and do that. They put in enough marketing effort in the past that there is enough media attention coming towards us and shops open minded enough to try it that a lower price point may help to grow the market. A couple of years ago it would have grown, but probably not quick enough for them to make any money at it. I think it made good sense for them to do it, the timing was good and for us as a company, just kind of going from a start up to a legitimate small/medium size business. We're up to 22 people now, and through a couple of million dollars in sales. It's not just a few guys having a good time playing with bikes. We're running a real business now with real employees that we

want to offer benefits to and provide a good living for them to raise a family and such, so for us as a company, we shifted from the start-up phase to this next phase of business. In the industry itself it's certainly been the same thing, where we could see the bike shows are so much more fun to do. You don't feel like you have to drag people in your booth. They kind of snicker and you say, no really, you want to give it a try? Now everybody that comes into the booth is either an existing dealer that wants to find out what's new or they say I've come to the bike show this year to find out what recumbents are all about—can you tell me. And that makes our job really easy. Mine in particular. I'm not a sales guy, I'm an engineer business guy and so I love to give anybody information they want, but for me to try and convince someone that this is the greatest thing since sliced bread, that's a difficult thing for me to do. It's a lot of fun to do. We've always had a great time at consumer shows. Consumers have always been interested. Our booths have always been the most mobbed at consumer shows, but at the trade shows, the bikes were not that interested early on, but now the mainstream dealers are getting very interested which helps us to grow better. They have the cash flow where they can afford to stock some bikes which better serves our customers. They have several bikes to choose from. Some can even afford to bring in several different companies so they can compare what the different companies offer. That is good for the recumbent industry and they've got a little deeper pockets so they can stock some bikes if they need to and the customer gets the bikes right away and is served a lot better. In the past we just had a few dedicated guys like yourself, but it's a big country so it's been difficult to serve them all well. We're sure to make some real inroads there. We still have a long way to go. It's a big country with a lot of bike shops, but we're going the right direction now.

KC: You mentioned Trek. So when a big player like Trek jumps in the game, what does that say?

Joel: For us it just does what we already knew. It tells the public that this is a valid design, that it does have a place among the different styles of bicycle. It's something we knew. The big companies are finally spending some money to try and find out for themselves. We were real excited to hear that someone would eventually, we're happy that they did it this year, this is a real good year for them to do it. For us, we're real excited because it will get a lot of press just because it has the Trek name on the side of it. They have a tremendous dealer network and if they have their sales reps trying to convince them that recumbents are a good thing, then we don't have that kind of sales force to put the kind of energy in it that they can.

KC: It's a blessing for all.

Joel: I think it really is. Usually, they say, "Is it scary that a big guy is coming into it?" I don't think so, I mean they don't have a full line of recumbents that they are going to compete with. They're just experimenting with recumbent bikes to find out what the market looks like, what the proper design should be and I can't be too critical with the design because it looks very similar to my R20 and so I kind of understand the mindset. They want to keep the same size of wheels, but you can't have two big wheels so lets have a 20 there and put a 20 in the back, and now the gearing is all messed up so we better do an intermediate drive. The 20-inch wheel, it's kind of stiff, maybe we better have some kind of suspension. So I understand the method of thinking on the bike. We shifted away from that for other reasons. I think they are trying hard, I think it's just a great thing for the industry. It'll help us grow easier having the big guys out there. At this point it doesn't look like they are going to be stepping on anybody's toes. The big concern was that they would come out with a real inexpensive bike and wipe everybody out and take all the sales away, but I think they are going to start where it makes sense, high enough that the units aren't going to be real high and they are going to make a little bit of money to pay for some of their R & D costs and just find out what the market looks like. It's a different market than what they are used to. The needs are different and I think it will be a market they can enjoy. It's not a bunch of 13 year-old-guys with no money that are just looking for sponsorship. It's baby boomers who have some real income. They understand the value of spending some money on something and they want to stay active. So it's that elusive thing that they have been

looking for and I think long term, they will probably find it.

KC: Monobeams (main frame tube-ed.). That's your philosophy.

Joel: Yeah. That started way back when I was playing with the R20.

I looked at it being a structural guy. Triangulation was always the purest, stiffest way to go and when I started looking at triangulated designs and understanding what the loads were, I couldn't make a triangulated design weigh less than just a simple monotube. It looked like if you had the space frame so that your overall section was larger, it would save some weight for the same stiffness, but by the time you connected all these long tubes together it just kept coming out fairly heavy and I knew that the analysis for the beam was such that I could predict what the stiffness of the frame would be, and I could tailor it to specifics that I wanted. I looked at a lot of different designs in the monotube from a structural standpoint. It looked like it would work fairly well as far as being efficient from a weight standpoint and I could easily tailor the stiffness to the bike and make it as stiff or as soft as I wanted it, which with a triangulated frame it's going to be stiff, so you really don't have a lot of choice in that. From a producibility standpoint, it's just so much simpler. From a fatigue standpoint you only have one tube to control, usually things are going to fail at the joints and if you just have a couple of joints you can make sure that you just do those very well as opposed to a whole bunch of small joints where every time you put heat near a tube, there is another area where there is potential for fatigue failure. That was something that they really pushed at Boeing where they rivet everything together, but they understand that every time you drill a hole and put a rivet in something it is a crack starter. The simpler design from a fatigue standpoint looked better to me, and then from a producibility standpoint, it would be so much simpler. That was a philosophy that I liked, and Grant kind of ended up in the same position, and when we got into starting the R40, we wanted to have a recumbent that we could push the price down to near \$1000, producibility was really key without having a lot of compromises from an engineering standpoint. We were very happy with it. Our R45, which is a monotube design, was the lightest bike that was out there, so we liked it structurally and from a feasibility standpoint as well.

KC: Tell us about the Sabre Project

Joel: The Sabre project was developed in 1997, primarily as a test platform. I wanted to do some experimentation with the design parameters of traditional (upright) bikes. Matching the wheelbase and head geometry of a racing bike, the Sabre was also equipped two 26" wheels. As part of a marketing test, the Sabre was fitted with a traditional and complete road component group.

The ride was fantastic, very smooth and controlled, and attracted a lot of attention. We did release a pre-production set of pictures, and received a tremendous amount of interest in the bike. The equal-sized wheels seemed to attract the most attention, as we received continual flow of comments about them.

The bike was built as a testing platform, not as a production prototype. We actually were rather surprised at how rideable it was, but there were problems. Unless the rider had an inseam of at least 31", a stool

was needed to mount or dismount the bike. We had also played with a very extreme seat position, perhaps too laid back for the general rider.

The one-and-only Sabre does still exist (and no, it's not for sale). It was very useful for the job I designed it for, and helped us develop more insight about bike design and functionality. You never know where the unique lineage of the Sabre might show up on future Visions models.

KC: What does Joel do to balance his life? What's the engineering business taught you? What do you do to loosen up?

Joel: The greatest thing about juggling so many things is that you never feel like you get burned out on one thing. As soon as I'm done with one thing, I've got three other projects that are in a completely different section of the company that I can play with. I mean I can be designing a bike one minute and if I get stuck in a corner somewhere, I can go and look at a financial spreadsheet and look at how things are going or I'll have an appointment with a banker to see how things are going or a conversation with an accountant. For me, I think that getting burned out on things usually just has to do with redundancy, and for me there are so many interesting corners of this company that help a lot. I really couldn't tell you how many hours I work a week, this is just what I do. As soon as I get tired of one corner of the company, I move for a few hours over to another area. And thankfully, our end product is something really fun. Every time I go out on a test ride, every time I leave I say, "Can you believe they pay me to do this?" How can you have a better job than to create something from your own mind and build it in a few hours and actually go out and ride it, get some fresh air. Building a product that is health oriented and is environmentally friendly was important and was something that was very interesting as well. If I can feel like I'm not neglecting the company by going out for a bike ride, that is the best of both worlds. Going out for a bike ride is not something that is just nice for me, it is imperative for me to do to make sure that the bikes are going the right direction. It helps for a nice balance. I'm a very outdoors oriented person, doing a lot of different human powered sports and they all overlap. It works out good. It also makes for great barter opportunities. I was able to trade a tandem bike for a tandem kayak for me and my wife and same thing with camping gear and stuff. It's a fun industry to be in from that standpoint.

KC: Is there anything you want to talk about that we haven't talked about?

Joel: I'm sure there is. I'm not a talkative enough type of guy to have something on the tip of my tongue.

KC: We covered a lot of stuff.

Joel: We did. It was a nice set of questions. □

Editor's Note: Kelvin Clark is the proprietor of Angletech in Woodland Park, Colorado. Kelvin is one of our industry's most respected dealer/manufacturers. Kelvin does all of the interviews live, has them transcribed from tape and supplies them to RCN pretty much as you have read. We all owe Kelvin a great deal of gratitude for this very time consuming process. □



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The Learning Curve — BALANCE

by Tony Sowers
psowers@pdx.oneworld.com

From the moment we first wobble off down the road on a recumbent bicycle, we all wonder, "Why are they so difficult to balance?"

The short answer is that the rider cannot use the body for balance. On a "wedgie," one can bend at the hips to shift the center of gravity (CG) to maintain balance as well as turning the wheel to move the bike under the body. Thus we have the interplay of two mechanisms: weight shifts (bending at the hips) and steering input or corrections.

On a recumbent, the rider is nestled into a far more comfortable seat, but he/she is unable to shift weight independently of the bicycle structure. We lose what is probably the most powerful balance correcting mechanism!

■ IS THIS IMPORTANT?

This loss of a major balance mechanism is of little importance at speeds of 8 MPH or above, but at lower speeds, it can be very troublesome. Climbing steep hills can commonly bring speed down to 2.0 to 4.0 MPH where balance becomes a major concern.

Why would one want to ride at such low speeds? If the riding is in Florida, you probably don't. In my case, my house is approached by a mile hill with a grade of 9%. I commonly "spin" up this hill at 2.4 MPH. I can assure you that I am VERY concerned with balance at low speeds.

■ WHAT CAN WE DO?

To determine what we can do to improve the situation, we need to break down the balance process to examine each part. Basically, there are three steps to balance on a recumbent:

- ✓ The rider's nervous system detects the imbalance.
- ✓ The rider gives steering input.
- ✓ Balance is recovered.

Detection of imbalance is a trainable skill. We use the skill every day when we stand up. Our inner ear, combined with a visual observation of our surroundings, says "Tilt!" and we make invisible corrections. In effect, the body is an "inertial platform" and detects deviation from the norm. With practice, we catch the tipping faster.

There is a delay between detection and action by the human body. During this delay, the imbalance is getting worse. Again, practice will improve the "connection" and shorten the time required. Note, however, that this delay is fixed and is not a function of the speed of the bicycle down the road.

■ STEERING INPUT

Giving steering input is a bit more complex, in terms of what we actually do and how that is used to affect the bicycle. Balance recovery consists of steering the bicycle in such a way that its wheels move under the center of gravity. There are three factors in this phase of recovery:

- ✓ The rider takes an action to turn the wheel.
- ✓ The bicycle tracks in the proper direction.
- ✓ The rider detects the recovery of balance and stops the correction.

There is a physiological delay in carrying out the action. It takes time for a rider to carry out large motor activity (turn the steering bar). Here, we can gain a bit by having very "sensitive" steering where small motion by the rider causes a large change in wheel angle. The downside is that too much motion can outstrip the rider's ability to stop the correction in a timely fashion —> possible crash!

The rate at which a bicycle falls over is independent of the speed of travel. If a rider can detect a 1 degree imbalance, it will generally take the same amount of time for the imbalance to reach 2 degrees. That means that steering corrections need to be more "extreme" at low speeds because there is more sideways motion required as compared to forward motion. Stated another way, if recovery requires movement to the right of one inch in, say, 2 seconds, this is harder to do at 2 MPH than at 5 MPH. The wheel has to be turned "harder" at low speeds.

■ BICYCLE DESIGN

The bicycle design is important in all this. A front fork directly attached to a straight steering riser with a short handlebar will give very sensitive steering. Further, the short handlebar requires minimal motion from the rider for a large change in angle. At low speeds, this is what you want in order to correct quickly and prevent extreme wander or falling.

At high speeds, on the other hand, many riders will find the "quick" steering to be "squirrely" or, even worse, unstable. For high-speed riding, we want relatively slow steering not affected much by unevenness of the road surface or muscle twitches by the rider. This would suggest wide handlebars or steering with a lot of "tiller." "Tiller" can be understood in relation to the tiller of a boat. It is a bar which moves side to side and thus turns the front wheel. Any steering arrangement which places the rider's hands behind the turning axis of the fork has some "tiller." Side to side motion of the rider's hands is not a motion which the human body does quickly. So the use of "tiller" serves to slow down the steering and damp road shock disturbances—just what we need at high speeds.

Look at any LWB recumbent. They all have a lot of "tiller," and they are all reported as "stable" on the highway (i.e. at high speeds). How can we get sensitive steering and a lot of "tiller" on the same bicycle? For a Short Wheel Base (SWB) like the RANS Vivo (my bike), one can push the steering column forward at low speeds (no tiller) and pull it back into your lap at high speeds (lots of tiller). You do need a method of holding the bar in the forward position and in the comfortable lap position, but it can be done and it does work as expected.

■ DISTURBANCES

Balancing is made more difficult if there are a lot of forces applied to the bike which tend to upset the balance. Usually, these forces are of two types: pedal action and road disturbance. You can't do much about road disturbances, other than attempting to miss "that rock," but you can do something about your pedal action.

I have found that a relatively high spin rate combined with a smooth pedaling action helps to avoid loss of balance. A slow cadence, on the other hand, leads to rhythmic disturbance of the system (pedal steer) and makes it harder to maintain balance. Note that this is counter-intuitive because we all learned to pump slowly on a standard bike when climbing a hill.

To get a high cadence, and better balance with it, you need God-awful low gearing. My lowest gear, including a Sachs 3x7 rear hub, is 11.2 gear inches and I am trying to take it even lower. I have a cassette with a 34-tooth low cog (giving 9.9 gear inches) on order!

■ MY CONCLUSIONS

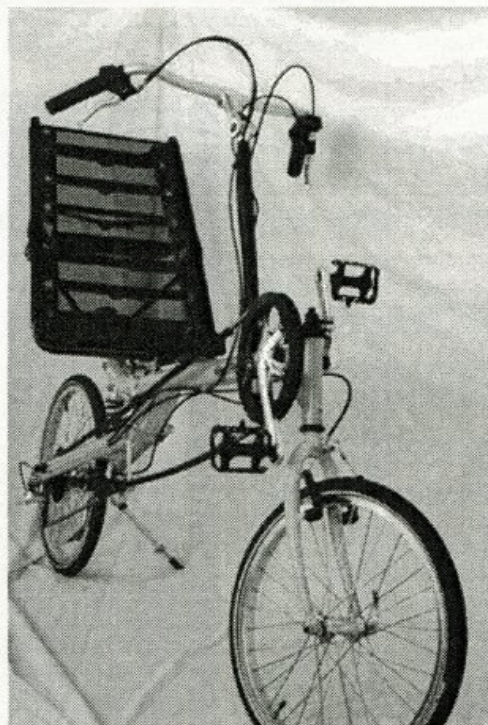
- ✓ Bikes with tiller will feel more stable at high speed.
- ✓ Bikes without tiller are easier to balance.
- ✓ At low speed, a SWB will be easier to balance than a LWB.
- ✓ The SWB, because it is short, can scoot back under the center of gravity more quickly.
- ✓ A high spin rate helps low-speed balance.
- ✓ Linkage USS is a system with no tiller and will be easier to balance than any competing system with tiller. Linkage with a motion step-up will improve balance further.

I welcome any discussion, contrary ideas, or support. Conclusions are a LOT stronger when supported by the experience of many people.

□

Tony Sowers is a semi-retired electronic engineer. Seeking a way to stay fit, he got interested in recumbents and has been trying to understand them ever since.

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Recumbent Mail

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CRUISER BENT

Here is my latest project recumbent. As you can see it has front and rear suspension. This, plus all of the curves that I designed into it. It was very difficult to build. Parts came from a Univega mountain bike, some 1" tubing that I purchased and the rest came out of the junk pile.

Carl Hoots, chtz@shasta.com

BENTAN PIST RESPONDS TO THE INDUSTRY

Dear Ricky and Jeremy,
You may nit-pick my editorial all you want, I have thick skin. But you still seem to be missing the point.

I have a joke for you: A baby Harp Seal walks into a club.....oops, wrong joke. A guy walks into a bike shop with a wad of cash in his fist and says to the sales clerk, "I'd like to buy a recumbent, please."

The sales clerk responds, "I'm sorry sir, we only received half of our pre-season order on time and all those bikes were pre-sold. Our next shipment isn't due to arrive for 2 more months.....But I can put you on our waiting list and call you when one is available!"

Guy walks out of the bike shop with cash still in fist. Come to think of it, neither are very funny jokes. Are they fellas? PS: I didn't notice any Dealers disagreeing with me ;)

Bentan Pist

WEIRD & OFFBEAT RCN

I love RCN. I get such a kick out of seeing the pictures of the interesting bikes you review, the weird stories of and by the offbeat "live in my bike" people, and the whole thing!! The rest of the bike magazine world is so sanitized.

I do have an important question. Why do we care if recumbents become more mainstream or not? I, too did feel the need to tell the world when I got my Tour Easy last year. I was walking around at work showing Easy Racer brochures to all my friends. While I do feel bad about the editors at *Bicycling* getting canned, I don't care about any "curse." I do believe in promoting the sport of recumbent cycling, but why should we care if others care?

You publish stories and detailed reviews that would never stand a chance in a corporate controlled mag. I hope you prosper, but I never want RCN to become an industry puppet magazine. Thanks for all your effort.

Alan Mushnick, AlanMush@aol.com

Alan, I don't really care if recumbents become mainstream. If Trek is any indication of how the "big boys" react to RCN, I don't care if any more of them come along. RCN is read by enthusiasts, we are not seeing the growth from the thousands of compact and entry-level recumbent customers. This is a new breed of customer who is a bit lazy by old enthusiast standards (unwilling to search for recumbents from a-far) and are only concerned with having a comfortable bike. That is okay, but it is just different. Thanks for the letter—Bob, RCN.

NO CURSE—BUY RCN STOCK, NOW!

Never fear. The recumbent market is alive and well. It is not being driven by *Bicycling Magazine*, although I agree it's nice that they have given recumbents good coverage in recent months. No, what is driving the recumbent market is specialty bicycle retailers. If you heard Chris Kegal's (Owner of Wheel & Sprocket in Milwaukee, WI) presentation at the Chicago Area Bicycle Dealers Association (CABDA) trade show last fall you know what I mean.

Chris pointed out that there are 72 million boomers moving into their mid and late forties. These folks are at their peak earning years and are reaching the point in life where the expense of raising a family, maintaining a home, etc. are decreasing as a percent of income. They are looking for ways to stay physically active, but back problems or other physical limitations prevent them from enjoying regular cycling. Recumbents are a comfortable alternative.

In addition to favorable demographics there is another event taking place that is encouraging bicycle dealers to get behind the recumbent market. The number of independent bicycle retailers in the U.S. is decreasing as bread and butter entry-level price points are being taken over by sporting goods, department and discount stores. Therefore, bicycle dealers are looking for product segments to sell that are not being sold by large retail chains. To illustrate my point, I must have talked to a dozen dealers at the CABDA show last fall that were there expressly to select recumbent, tandem and/or electric bike lines. If there is any question about what I am saying I suggest you call a few of your retail advertisers and ask them how recumbent sales have grown the last few years and how many dealers in their area have started selling recumbents in the last year.

I am giving credit for the growth of recumbent sales to bicycle dealers, but the real "heroes" are recumbent riders. They are driving customers into dealer stores. They are sharing their knowledge with dealers to help them get up to



Carl Hoots' stylish cruiser recumbent

speed. I have even seen recumbent riders volunteer to work at a dealer store just because they love the sport so much and want to see it grow. They truly enjoy sharing their experience with new riders.

Not to worry Bob, you will see double digit (maybe even triple digit) growth in the recumbent market for at least five, perhaps even ten years. Recumbents are going mainstream, limited only by the ability of manufacturers to keep up with the demand. If you were selling stock in RCN I would buy as much as I could afford.

Fred Teeman, fteeman@gateway.net

IT'S THE MONEY SILLY

In the May/June issue of RCN, Robert Bryant talks about the curse of recumbency. The question seems to be what REALLY is holding back recumbent bicycle usage in the general population? For me, the answer is very simple—PRICE! You can get a WHOLE lot of conventional (wedgie) bicycle for under \$500! This is not the case with any machine with the word "recumbent" attached to it. Even my ReBike was \$700! That was a lot of money to shell out for a basic, heavy, all-too-flawed piece of machinery.

There is no curse. Only common sense. I'm goofy about these machines and that's the bottom line. At these prices, you HAVE to be goofy about these machines to buy them. The prices simply HAVE to come down.

Larry Ripp, St. Paul, MN

POLITICAL OSTRICHES

Recumbent cyclists need to become politically engaged in the ongoing road wars that are encompassing our communities. During the past year a number of commuting cyclists have been killed in traffic and no charges were laid, the assumption of guilt always being attributed to the dead cyclist. With urban sprawl and the rapid loss of rural areas surrounding the places where we live it is imperative that recumbent cyclists take their collective heads out of the sand and take a stand.

My point is that recumbent cyclists sometimes get so caught up in the technical nature of their bikes that they don't notice that the actual experience of cycling is changing for the worse. Most urban cyclists now have to drive and then cycle or fight through an hour of traffic to experience an hour of enjoyable quiet rural riding before spending another hour fighting their way back home. I think too many fledgling recumbent organisations assume that their mandate should only include the technical exploration of recumbency, organising a ride schedule, and recumbent promotional events. While these goals are laudable they are also narrow and short-sighted. Recumbent cyclists must raise their collective heads out of their toolboxes and join their cyclist colleagues in the political fight for their environmentally friendly piece of the turf.

David Laidlaw, laidlawm@uoguelph.ca

David, I appreciate and respect your point of view. I have discussed the fact that cars are our enemies in RCN. Bicycling as a sport/hobby is on the decline, possibly due to the lack of safe places to ride. I no longer use my "Black

Diamond" test loop or lead rides there because of the unsafe traffic. However, most recumbent rider groups are tiny grass roots groups that can only do so much. And that is why there are advocacy groups—Bob, RCN.

OVERPRICED RECUMBENTS

Maybe it's my age, maybe I am grumpy, or maybe I don't like shopping. Whatever it is, I am frustrated. What caused the consternation was the arrival last week of the RCN Buyers' Guide, followed by the current issue of Adventure Cycling and a recently purchased copy of Bicycling.

It's not that I'm cheap; my toys are expensive and include an RV, etc. The difficulty I am having is with value. When I make a purchase, I expect to get value for the money I spend.

In *Bicycling* I saw an example, a fine quality LeMond for about \$1900, which I assume is a good value. In *Adventure Cycling* I saw an ad for a Rivendell Heron for \$1850, which seems like a good value. In *RCN* I saw recumbents listing from \$650-\$7400. I can't seem to find a recumbent with similar quality as those I mentioned for a similar price.

I understand the industry is small, I understand that they are built in small shops with few employees, but I believe that it is also true for many custom upright shops. So my question or gripe is why does their appear to be less value in recumbents. I had intended to be buying a 'bent in the next few months, but I think I'll just wait for a while and continue riding my 25-year-old upright.

Daniel Hyduk

Daniel, "VALUE" is a key word. Any handmade bike is a good value next to electronics and RV's (gee, think of the interest paid on a \$50K-500K RV). Recumbents are in their infancy. Are you interested in finding a good value or finding the right bike? All recumbents are not created equal. Besides the "small company" excuse, recumbents ARE more expensive to build. A seat is the best example. A typical wedgie "gel" saddle cost a few bucks to manufacture. A recumbent seat can cost 20-50X that amount. They are more complex, must be comfortable, lightweight, supportive to your back—and there is NO EXCUSE if they are uncomfortable. I am certain that you'd see the "VALUE" in the comfort of a recumbent bike. The bikes you've mentioned may indeed be great bikes and good values, though they cannot even come close to the COMFORT of a recumbent. If you want nicer specs, there are several dealers willing to do this for you and charge accordingly.

Lastly, recumbents require components that come from BMX, road and MTB—there is no recumbent "GROUP." And few manufacturers buy direct from Taiwan like the big wedgie manufacturers do—Bob, RCN.

RECUMBENT WORKOUTS

What exercises can one do to get in shape for riding recumbents? My wife and I are interested in trying them out and want to be in good shape before we do this. There is still snow here in Wisconsin so we have a few months to get in shape.

mkosloski@hotmail.com

Walking, stair stepper, indoor recumbent trainer or stationary trainers work the best. Anything that builds leg strength and increases wind power. The indoor trainer works particularly well for "interval" training. This is how I got in the best shape of my life. It is boring, and I found it not sustainable, so I now walk 3-4 miles per day with my wife on non-riding days. I would guess that cross country skiing would do it too—Bob, RCN.

BROMPTON RECUMBENT

Following the article in the latest RCN about the recumbent conversion kit for the Brompton folder - I happened to be in our local recumbent-friendly shop yesterday. Who should be the first person I encounter going through the door? Juliane Neuss, the designer of the conversion kit, that's who, getting her gear cable fixed. Without much arm-twisting, I was persuaded to take the bike for a quick spin around the block. Bearing in mind that Juliane is a LOT shorter than me, obliging me to ride in a knees-at-comedy-angle position, and that the bike had normal pedals while I had racing shoes with Look plates, and that the brakes were set up the opposite way from what I'm used to, well, it rides very well. The seat felt pretty good (OK, I've been on a variety of uprights for the past six weeks...), and the drive train—belt drive from the cranks down to the standard Brompton b/b, normal chain from there on back—was smooth and quiet. Magura brakes on this one, so stopping power was excellent, once I'd figured out which lever did what! All in all, it felt like a pukka SWB recumbent. I'm impressed.

Dave Larrington, legs_larry@yahoo.com

BikeE CITY COMMUTER

Thanks for #50: another great RCN for history! I'd like to add one more item of BikeE "Cool Stuff." I've found the under-seat pannier rack to be great not only for touring, but also for loaded commuting. The reason is weight distribution. For example, when I go grocery shopping I put the potato chips behind the seat (in a basket attached to the frame via accessory mounts; the BikeE bag is good, too!). But heavy cans and bottles go into panniers (I like Ortliebs) on the under-seat rack. This puts the weight low and forward, and makes the BikeE the only bike I know of that becomes more stable as it's loaded! I can't imagine why other CLWB manufacturers haven't introduced something similar. Add fenders, good lights & reflectors, horn or bell, lock, mirror, flag or spinnie, and possibly a Zipper fairing, and you're in command of something close to the ultimate around-town machine. The compact is handy to park, T-bar ASS makes it easy to walk when required, and while waiting for a stoplight I'm the most relaxed guy at the intersection: both feet flat on the ground. Hey, I brought my chair! My commuter BikeE is a '96. My

5-year-old son's treasured mount is an early '93 which Paul Atwood can be proud of: its way-laid-back head tube produces a comfortable "begging-hamster" riding position, and its vintage Suntour running gear is bullet-proof.

Feet first! Parker Swanson

VIVA LAS VEGAS

I just received my new subscription to RCN starting with Jan-Feb & Mar-Apr issues. I particularly enjoyed the Jan-Feb article "Viva Las Vegas" on the Interbike Show. On page 18 there is a picture of the Radius Recumbents Hornet & C4, with a question of who is selling them. I don't know about those two specifically, but I recently bought a Radius Gecko. My Gecko is a great bike, and I got it at a great price! I got my Gecko from Ray at The Recumbent Barn (www.recumbent-barn.com). I don't know if he is still dealing Radius bikes though, as Ray is a discounter and gets a great deal of pressure from manufacturers to keep prices high. I believe he is now moving into mass producing two models of his own.

Paul in Huber Heights, Ohio

Paul, The Gecko is not really a Radius. Radius of Germany went out of business last year. Ray of Recumbent Barn bought the Gecko's from Nils Palm, also of Germany. The bikes were built in Taiwan I believe. Nils bought the rights to the Radius name and now builds the Hornet SWB and C4 MWB. Ray is no longer dealing with Nils Palm or Radius from what I can tell. Recumbent Barn has purchased all of the existing former Radius Red Pepper frames and now offers them as the "Redbent." at very affordable prices. The Red Pepper/Redbent is also the forerunner to the C4. Recumbent Barn's "Blackbent" is a new low cost SWB that we will hopefully be reviewing soon. I have seen Gecko-like recumbents from two or three sources (including Ballistic), though I don't think that bike is available in the USA anymore. We were never given the opportunity to test the Gecko, though I have seen it—Bob, RCN.

LWB King of the Hill

I've just read your RCN #50 and want to comment on the letter from Mike Nunez: The whole SWB vs LWB debate is beside the point. On smooth paved surfaces and where automobile transport is not an issue, the LWB cannot be beat.

The SWB seems to have two "homes." For rough country-like gravel roads and unpaved mountain going where low speed is the norm, SWB does the job by facilitating low speed balance. The good ones are also acceptable on pavement and, therefore, more universal than an LWB.

Where it is necessary to drive a car to the ride location, SWB is a lot easier to handle on and off a rack (though not perfect). In my case, I live in an area of gravel roads, steep hills, and little pavement. I figure I HAVE to use a SWB. If I lived in an urban area, riding on residential streets and paved trails, I'd probably have a LWB. I think it is as simple as that—both designs have their place on the roads and trails of this country.

Tony Sowers, psowers@pdx.oneworld.com

HPM UPDATE

We know we are on the same team and I appreciate your fairness and honesty. CAT is a 501c3 nonprofit. It has 5 businesses associated with it. Pedalers Express, Oregon Cycling, Eugene Rack Works, Eugene Bicycle Works and CAT/HPM. We have youth programs that work with each biz. HPM is a sole prop. I contract my designs and tools out to the nonprofit CAT/HPM. That allows us a basis for the Bicycle Framebuilding Apprenticeship program.

I was curious. Isn't the Bean the KingCycle? Isn't it still a top record holder? How many other recumbents are faster? If that design is in that category why is the Trick passe as a frame config?

The Trick SWB now comes with direct linkage USS. This has proven to be the most popular steering arrangement. We now have a recline angle adjuster on the ASS and a 3" curved aluminum plate that acts as a rack mount and a fender for the rear wheel. We now use Avid brake handles.

Jan Vander Tuin, Human Powered Machines

Jan, The Bean is a fully faired streamliner with a monocoque body/frame. The Kingcycle had a petite CroMo frame with aero tubes and was a minimalist performance machine. The Kingcycle was a true thoroughbred, though not for everyone. Even though the "Trick" has the same "A" frame design style, the bikes are very different in the design intention. The Trick arrived here with the biggest, beefiest tires of any recumbent to date. There was no indication that this was a high performance bike—Bob, RCN.

RCN#51 IS A GOOFED UP MESS

What a goofed up mess your RCN#51 is. You should take Bobby Bryant out behind the shed and whale his & %\$! black and blue. I'm glad this issue will be my last. The RCN's of the past have been lousy and for the money, I'd expect much more. You constantly cry poor, if that poor, go out of business. NUFF SAID.

Completely Disatisfied

Some RCN#51's were coalated wrong, had duplicate pages and missing pages. We inspected 1000 and never found a single messed up copy. As of this writing, we have replaced 25. RCN#51 was well ahead of schedule. We have been mailing replacement issues within two days via first class mail. As for the rest of your message, I'd truly like to know what REALLY set you off—Bob, RCN.

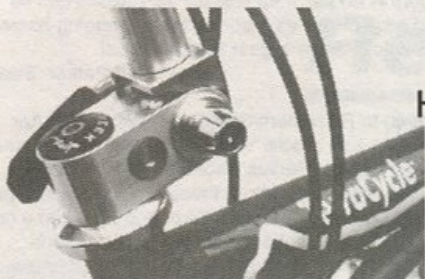
RCN#50—OUR FIFTIETH ISSUE

Congrats on ISSUE#50! Nice issue to celebrate your 50th out the door. Thanks and congrats!

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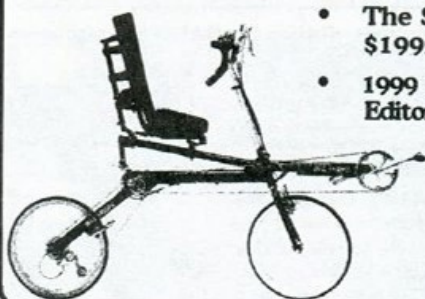
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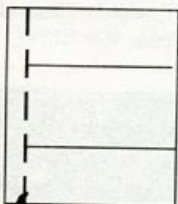


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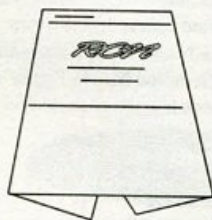
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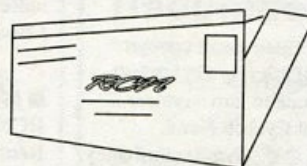


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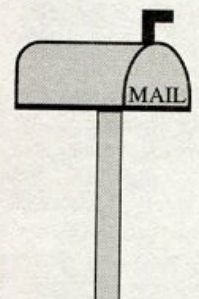


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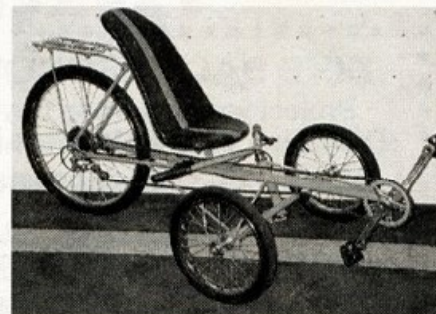
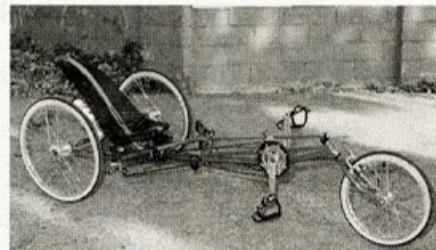
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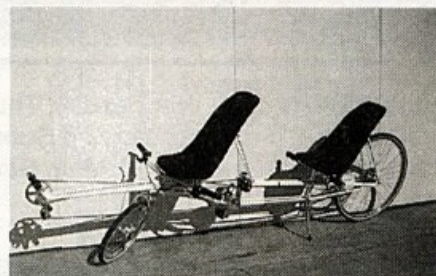


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People Movers News Vol. 52

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RECUMBENT BIKES FOR SALE

People Movers is a Factory Authorized recumbent retailer, offering parts, accessories, recumbent bikes and custom builds.

New bikes available for sale..... Tour Easys, Waves, Horizons, Linears, Tailwinds, BikeE's, V-Rex's, Stratus's and Tailwinds (and others). We'll also have the new Trek available when they are shipped.

Two Greenspeed tandems are still looking for new owners. Price? \$6500 plus delivery. We also have a couple of **single Greenspeed trikes** available (\$3200) plus delivery.

Frank Colver says that his off road creation, the **DESERT BIKE**, will make it's debut in July. Five are being made and only 2 are left for sale. Priced at \$4495, these truly unique recumbents can be ridden anywhere, including sand or snow.



Frank Colver's DESERT BIKE recumbent—photo courtesy of Frank Colver

People Movers Annual Ride The Main Event Round 6

People Movers Annual Recumbent Ride is Labor Day weekend, Saturday, September 4th.

Registration begins June 1st and is limited to 200 participants. There will be new games, ride and prizes and a few surprises.

Registration fee is \$40 person, \$75 per couple. Refreshments, breakfast and lunch will be served. Every gets a new 1999 T-Shirt and a chance to win a new bike. (There may be two bikes with the winner of the having to be present).

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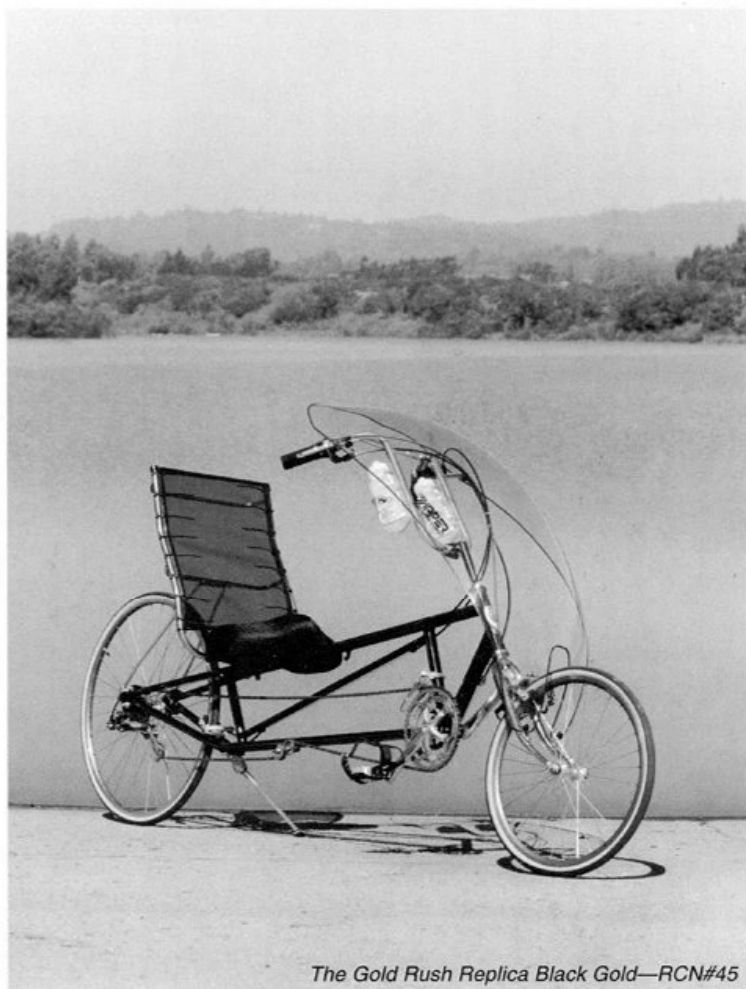
"I now weigh 235 (down from 265), have a 50 resting heart beat, can play a little touch football with my son, have absolutely no knee pain and feel like a new person. Thanks for the extra "life" you have given me. Thanks again for producing this fine bike." From Wisconsin. 

"I had two major spinal surgeries a year ago. I bought a Gold Rush Replica. I know this sounds a little nuts but your bike has given me a real boost. It is so great to be involved in a sport that does not stress my spine." From Florida. 


"I am fearless on the Gold Rush. That bike just loves to go fast. At 40 mph it's rock steady." From Georgia. 

"The frame is beautifully built and the components are great. My maximum speeds have increased significantly and I haven't found a hill I can't climb. It may well be the last bike I'll own." From Maryland. 

"We have a large assortment of bikes in the garage, and I always introduce my wife's Tour



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