THE

RECUMBENT CYCLIST

A Journal for Human Power Enthusiasts

SUMMER 1990--VOL. 1 NO. 2
Published, Edited and Produced by Robert J. Bryant
NWHPVA, 16621-123rd Ave. S.E., Renton WA 98058

Flevo bike

**COVER STORY PAGE-11**
Mini-Review
The Counterpoint Presto

The Presto is the most innovative SWB recumbent to come along in quite a while. I have test-ridden it several times over the last two years. The bike I rode on this occasion was a gorgeous Rhapsody Blue version. The first thing you will notice about the Presto is the two 20" wheels, the second is the modified stem/handlebar extension, similar to the one on the Lightning P38, except the Presto's reclines back and forth to allow easy entrance to the seat. The Presto's seat is the same on found on the Opus tandem, and is among the most comfortable recumbent seats that I have ever sat in. The stem/bars feel strange until you actually slide up into the seat, the riding position is wonderful! I really liked the reclining stem. Although, since my original test, I have ridden a custom underseat steering version that is also very comfortable.

I found the Presto to be very fast and stable, once I got used to the very short (36.75") wheelbase. The '90 version has a little quicker handling due to the new cro-moly BMX racing fork with a little less rake. To correct this Angle Lake has added a steering dampener to the headset.

The handlebars on the newest version are extra-wide flared drop-bars and bar-end shifters. This is a near perfect hand position.

Some riders have commented that the Presto seat height makes planting your feet on the ground during stops and starts difficult. At 6', I do not have this problem, but I can see how this could become a problem for a shorter rider.

For the '90 model, the seat side rails have been shortened by 1.5" and the seat frame is now powdercoated black.

The Presto's 20" wheels perhaps account for the added seat height. This along with the optional folding boom, makes the bike very compact. The one drawback to the small wheels is gearing. The Presto is not designed to take a triple crankset. So a wide gear range is hard to obtain, stock gear range is (approx.) is 30-93 gear inches. I am of belief that a recumbent should have a very-wide gear range. By wide, I mean a low in the low-mid 20's and a high of just over 100 (gear inches).

The Presto is a fine machine and a real contender in the limited SWB market. I particularly like all of the innovations--the movable stem and the sprung seat, yes suspension, a very simple, but workable suspension design. The price of our test-bike was $1499, which is the base price for the limited production '90 Presto. If you are interested in a SWB recumbent, you should check out the Presto. With its fine craftsmanship and top quality components, but best of all, it is a absolute blast to ride...**

The Counterpoint Presto is sold exclusively by Angle Lake Cyclery, 20840-Pacific Highway So., Seattle WA 98188 USA 206-878-7457

Robert J. Bryant

**The Recumbent Club of America**
**Recumbent Cyclist**

Presto Specs. on Page-10
FUTURE-BIKE
"Cycling in the '90s"

It really makes my day when I open the latest issue from one of the mainstream bike magazines, and find an HPV-related article. They seem to be so few and far between. There have been a few recently that I thought were worth mentioning.

The February '90 Bicycling Magazine had a story on "Bicycling in the 90's". Along with predictions of electric gear shifts and suspension for Mountain Bikes, a great quote from friend of Human Power, Chester R. Kyle PhD, here is the quote, "For recreation and commuting, tradition will yield and a significant number of recumbents will be used. They make lots of sense for safety and comfort, eliminating sore hands, chafed rear ends and worries about falling on your head. You sit in an easy chair with your feet forward, your body close to the ground, and your head comfortably erect for good forward vision." Amen.

"Original Thinking", an article in the June '90 issue of "Bicycle Guide", by Christopher Koch. I was really impressed, the abbreviation "HPV" was used three times! Human Powered Vehicles was actually spelled out so we would know what they are. The article is actually very good. A quote by the author Christopher Koch sums up the evolution of the upright bicycle, "When you consider that the bicycle has looked virtually the same for 100 years, its easy to see why some observers believe that the bicycle industry follows the Ronald Reagan School of Original thinking, just find your mark and read the card."

The author asks several framebuilders and designers about the future of the bicycle. Here are some of the responses; John Slawta of Landshark Bicycles in Pacoima, California had visions of a frame building kit of PVC plastic, glued together and activated by ultraviolet light. I hope that the tubes are long and large diameter for HPV use! (ed.)

Glenn Erickson of Erickson Racing Bicycles in Seattle talked of "dial in shock absorption" and a foldable rain shell. Where's he from again. (ed.)

Skip Hujsak of Hujsak Bicycles in Wimberly Texas likes small wheels, 24 inchers to be exact. A quote, "The aerodynamics of a 24" wheel can't be beat, and they're almost half the weight of a 700C wheel." I like them even smaller, 16"-17"-20"! Alex Moulton had this idea a long time ago.... (ed.)

The best ideas came from "Original Thinker", Gary Fisher, of Fisher Mountain Bikes in San Rafael California. He's after the "Ultimate HPV", a sleek commuter vehicle I imagine, although the word "recumbent", was not mentioned. Here is a quote from Gary's vision, "I'd love to see elevated bikeways built like wooden velodromes where you're totally covered in a pipeline that would go in one direction, and you'd have continued on Pg-9
THE '92'S ARE HERE!

THE MISSION
AFFORDABLE, CLASSIC AMERICAN STYLE FLASHES BACK TO THE COLORFUL, ROMANTIC TIMES OF 'EASY RIDER' IN TOP-GRAIN LEATHER, GLEAMING BLACK, & CHROME BY THE BUCKETFUL!

THE EXECULINER
A NIMBLE COMMUTE PAST ALL TRAFFIC, OR A SABBATICAL TOUR OF THE HEMISPHERES YOU ALWAYS DREAMED OF, OUR TOP LUXURY FLAGSHIP HAS IT ALL! WITH OUR EXCLUSIVE "PHOTOELECTRAGLIDE" OPTION, IT BECOMES A TRUE HH/PP-PV (HYBRID HUMAN/POTOELECTRAGLIDE-POWERED VEHICLE)

THE PEDA-JETSTER II
FAMILY HPV-ING AT ITS FINEST! FILLS THE GAP BETWEEN OUR CHILD-PASSENGER-ANT-TRAILER OPTION AND FULL-SIZE HPV'S. INTERACTIVE VIDEO EDUCATION SYSTEM AND ROAD-BLASTER SOUNDS FOR HAPPY, INTELLIGENT LITTLE NOMADS!

THE A.N.T. (ADVANCED NOMADIC TRAILER)
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THE PARSEC
WANNA RACE, DUDE? THIS STICK O' DYNAMITE IS THE "E" TICKET! FASTER THAN A SILVER BULLET, MORE POWERFUL THAN A GOLD RUSH. THIS POP USES ONLY THE MOST EXOTIC MATERIALS AND YANKEE ENGINERITY TO COMPLEMENT YOUR POTENTIAL FOR RECORD-BUSTIN' RIDES!

NOMADIC RESEARCH LABS, INC.
"DON'T GET MAD, GET NOMADIC!"

Artwork by Dan Burdick of San Jose California
Originally Published in "The Journal of High-Tech Nomadness"

****
Have you ever wanted to build a custom enclosure, oddly shaped structure, waterproof canopy, camper shell, or special box — only to be frustrated by the cost and effort involved in fabrication? You know the scenario: without facilities for this kind of work, you end up spending far too much, compromising your design with scrounged junk, or simply forgetting the whole damn thing.

This is the mode I was in when designing the Winnebiko's new trailer (or WASU, for Wheeled Auxiliary Storage Unit). I knew what I wanted — a lightweight, waterproof, aerodynamic structure with wheel wells, special flanges for equipment and antenna mounting, sealed access panels, a 72-watt solar lid, and so on. But how would I build such a thing? I even considered hacking up one of those hideous black plastic tool bins they sell for pickup-truck beds.

I described the whole problem to Dave Berkstresser one evening. Dave is one of those wizards who can sketch a dozen unique solutions to any mechanical problem that seemed impossible only moments before, and is the designer of the eccentric, agile, and swift Vacuum Velocipede human-powered vehicle.

"Build it with cardboard," he told me, taking a sip of beer.

"No, seriously," I replied.

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CSPC: THE POOR MAN'S COMPOSITE

"I am serious," he insisted. "Take a hot-glue gun, throw together your basic shape out of an old refrigerator box, then fiberglass over it. I made a kayak out of cardboard once."

The elegance of his suggestion was instantly obvious. All sorts of structures ranging from airplane wings to transit boxes for delicate equipment are made of composites, structures that consist of two walls separated by a "matrix." Usually some kind of foam or honeycomb, this core is what keeps the thin walls at a constant distance and provides the dimensionality and moment that keeps them from collapsing. Some of these materials, such as Hexcel, are among the most high-tech structural materials available.

And garden-variety corrugated cardboard is a close analogue! It is used everywhere you look for very good reasons: it's strong, light, and cheap. Covered with fiberglass, it's waterproof, good-looking, and stronger still. And best of all, it is infinitely hackable... if you screw the design up, you can always scrounge more cardboard and brush on some more goo.

Heh.

Need a name for this wonderful discovery, Dave and I puzzled for a while and finally came up with CSPC... or Celullose-core, Silicon-matrix, Polyester-filled Composite. And now, a few months later, I'm building the Winnebiko 3's communications and power systems into a blazing-yellow custom trailer that looks like a cross between a '56 Buick and a solar-panel-encrusted satellite.

CARDBOARD CONSTRUCTION

The first step in building anything using this method is to noodle over it for awhile, sketching and perhaps even making models until you know what you really want. Then buy a hot-glue gun (typically about $15) and lay in a good supply of cardboard.

A note here about materials. Corrugated cardboard comes in all sorts of styles (never thought about this before, did you?), ranging from heavy thick mushy stuff to thin, brittle material that cracks when you bend
it. Somewhere in between is the right stuff — look for a good stiff feel, thin walls, and consistent corrugations. There's no reason to go with heavy cardboard for strength: all we're trying to do here is hold the two fiberglass layers in a fixed relationship. Get material that feels clean and light, and hasn't been walked on or creased.

Now you can start construction. Using a metal yardstick and a good sharp knife (X-acto or retractable), cut the pieces as you need them, being conscious of "grain" wherever you have to make a bend. At every junction, run a bead of hot-melt glue, on both sides if necessary.

There are a few tricks that make later work easier...

First, fiberglass doesn't like abrupt sharp angles — it will gap and leave ugly air spaces. Don't make any angles sharper than 45 degrees, or any right angles with a bend radius of less than a half-inch or so. You can usually get away with using a circular sander or rasp to brutally round the edges, but if you can add a long strip to break right-angle joints — it will keep resin off your elbows, and probably look better.

Once you have the cardboard structure intact, stare at it, play with it, and think through all the ramifications of the design. It will be hackable later if you forget something, but it's a lot more so now. If there's anyplace you will have a bolt compressing the surface, mash the cardboard flat so it won't collapse and loosen later; wherever there will be major stress, add reinforcement. Smooth off all the blobs of glue, round the corners (I did the outside edge of the solar lid by gluing on half-round pine, sculpted smooth on the corners), and mentally run through the glassing process.

Like it? Time to make it permanent.

CLOTH AND GOO

When you go out looking for fiberglass material, you'll find yourself deluged with options (unless you go to the local hardware store, in which case you'll have too few). In California, the best supplier is Tap Plastics, and the personnel are quite knowledgable about the fiberglass cloth and resins they sell. There are a couple of basic choices...

First, polyester resin versus epoxy. Polyester is cheaper and much less nasty to work with, but is less strong. Your application will determine which makes more sense — I used polyester. Also, be aware of the meaning of "surface curing agent" — a waxy additive that seals the layup to help it cure. Problem is, it also interferes with adding additional layers. Avoid this entirely, and use structural layup resin or bond coat, not surfacing resin. My personal preference is the thixotropic structural layup resin — it's easy to brush on, doesn't sag or puddle, and cures quickly. You'll also need catalyst, which is the highly poisonous Methyl Ethyl Ketone Peroxide. If weight is critical, you can add millions of tiny air pockets by mixing "micro balloons" with the resin.

Second, you'll need to select the kind of cloth you want. This is very important, for it will determine weight, flexibility, cost, and appearance. It's also very much a function of the job. On the trailer, I used Tap "A" and "C" weight cloth, the latter being lighter (5.85 oz per square yard, .01" thick). Considering that your base material is cardboard, going with super heavy cloth, thick mat, or woven roving is generally overkill. At the other end of the spectrum is light "deck cloth," which cures almost transparent. Again, think through the project, decide where the stresses are and where you just want to waterproof the surface, then choose accordingly. In my case, the trailer floor and lid structures are mostly "A" cloth, and the sidewalls are covered with "C."

Other materials for the job are mixing cups (start with the graduat-
ed paper measuring cups, then once
you get the hang of it you can switch
to old tin cans), stirring sticks, cheap
brushes, acetone for cleanup, paper
towels, and scissors. You also need
to decide how you want to keep the
stuff off your hands, and TAKE
THIS ISSUE SERIOUSLY! These
chemicals have a cumulative effect
when absorbed through the skin, and
you may get away with sloppiness for
years then suddenly develop an an-
giizing, lifelong allergic reaction to
resin and catalyst. The homebuilt
aircraft world is full of sad stories
about people who sold their partially-
built planes after careless habits
made dealing with fiberglass impos-

ble.

When I started this project, I used
rubber gloves and kept a bar of Neu-
tralona handy. The gloves were
loose and sloppy, and led to more of a
mess than doing it barehanded —
but it took a while to develop tech-
niques of dealing with the brush and
mixing cans (like always wiping at the
seam so you know where not to
touch). After a few sessions, I aban-
donned the sticky gloves and tried to
be careful, washing after every batch.
Now I use Glove Cote, which is a
lanolin-based cream that's supposed
to keep you safe.

OK, ready to start? Take the
phone off the hook. A batch under
normal thermal conditions will only
last about 10-15 minutes, so you don't
want interruptions. Mix the stuff
according to directions and lay down
a preliminary coat on the cardboard
surfaces you'll be working on first —
this helps adhesion and is quite nec-
essary. When the batch starts to
thicken, STOP — it won't soak in,
and will have the opposite effect
instead.

Now cut your first pieces of cloth
and lay them on the cardboard,
which should be tacky. The wrinkles
will brush out. Start laying up the
structure, adding layers where you
think the major stresses will concen-
trate (corners, support points, etc.).
This is where the art comes in —
after a while you'll just know how
much cloth to use and how thickly to
brush on the resin. In general, you
want to use just enough to make
the cloth transparent, but not enough
to puddle. The strength lies in bonded
cloth, not globs of brittle resin.

Take successive passes at the
work, never mixing more than 5
ounces of resin or so unless you're
covering a large area with a large
brush. Overlap the cloth by a few
inches, and keep working at it until
you feel that the coverage is com-
plete. Notice the material's reluct-
tance to take sharp bends... this is
how you gradually homed in on the
constraints that affect the initial car-
dboard design. On exposed edges, let
the wetted cloth hang off — don't try
to wrap it around.

Finishing the edges is easy if you
do this. After it's all dry, you can
cut the excess cloth with a sharp
knife, then use a file to remove any
sharp points. It will look terrible.
But now mix up a small batch of Tap
500 plastic filler and work it into the
exposed corrugations with a plastic
squeegee, then file and sand after it
dries. The result will be smooth,
waterproof edge that takes paint easi-
ly and completely conceals the truth
that the core of this beautiful
structure is an old cardboard box!

FINISHING

How pretty do you want this? If
you've come this far, you'll have a
rather ugly brown material, with lots
of ragged overlaps and texture vari-
adions. If the need is purely structural,
this may be the place to stop.

There are two ways to add color.
First, as I did on the trailer's under-
side, you can mix special concentra-
ted pigments with the resin (I used
black). This in no way alters the sur-
face texture, but it does hide the big
Hotpoint logo which would otherwise
show through the cardboard.

The other way is with paint, and
this is another one of those areas
where time, money, skill, experience,
and luck all conspire to yield either
beauty or a giant mess. I did the
trailer lid with a yellow epoxy paint
and had all sorts of problems — now
I need to sandblast it off and try
again. The body is another story:
Maggie put her old auto-body skills
to work during a full week of applic-
ing Tap 500 (like Bondo) and sand-
paper, finally perfecting the surface
with glazing putty. We then took it to
Charles Tripp in Los Gatos, who did
a beautiful job of spraying on DuPont
Imron (a fiesty thoroughlybred of
paints, not for the poor or faint-
hearted). The staff is over $100 a gallon
and can cause respiratory failure if
you spray without breathing appar-
utus, but it looks great.

And there you have it. The trailer,
for a moderate amount of time and
money, looks professional enough to
prompt people to ask where I bought
it. I grin and tell them it's just some
old cardboard boxes, glass, goo, and
paint. They don't believe me.

I do have one final suggestion if
you try this on your own structural
fabrication problems. Do an unim-
portant test project first to get most
of the mistakes out of the way. That
first layup will seem awkward and
messy, with the cloth buckling and
resin dripping down your chin. But
give it a chance... it works!

NOTE: To find out if there is a Tap
Plastics dealer near you or to request a
catalog, call the company headquar-
ters at 415-829-4889. Since a num-
er of the chemical products involved
in this kind of work cannot be legal-
ly shipped, they are unfortunately not
a mail-order supplier, but there are 15
stores on the west coast.

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The highway engineer gets a new pocket
calculator for his birthday...
THE HISTORY OF THE SHORT-WHEELBASE RECUMBENT part 1

Believe it or not, recumbent bicycles as we know them go back as far as 1895 when a man named Challand built a recumbent in Belgium. This was not a short wheelbase, but probably leaning more towards a medium wheelbase. The real turning point occurred in the mid-thirties when a relatively unknown French bicycle racer, Francois Faure, riding a recumbent bicycle built by Charles Mochet shattered speed records for the mile and kilometer riding the "Velocar". The result of this all this was that recumbent bicycles were banned from all UCI racing, a rule that is still in effect today. The Velocar was a long-wheelbase recumbent, it looks like the predecessor to the Easy Racer. Now on to the short wheelbase recumbents.

The "Ravat Cycloratio" was a true short-wheelbase recumbent. Built in Italy and imported to England by the Cyclo Company in 1936. So the design became known as the Cycloratio. As you can see the Cyclo has a very short wheelbase, about 31". The bottom-bracket is also very high off the ground-28". The wheels are 27 X 1 1/2" rear and a 18 X 1-3/8" front. It also has a very steep 75 head angle. The frame is built of oval steel tubing. I have seen two different seating configurations on these. The first had a sprung leather bicycle seat with a padded backrest, the second just a padded seat/backrest combination. This short-wheelbase recumbent was years ahead of its time. If you compare the design to modern day SWB recumbents, you will see many similarities. From the thirties through the sixties I could not find any documentation on any short-wheelbase recumbents. So from here we go to the mid-sixties.

Special thanks to David Gordon Wilson's article "Evolution of Recumbent Bicycles and the design of the Avatar Bluebell" and to Mike Eliason for his article, "Antique Recumbents".***

If you would like to add something to this series on the SWB recumbents or you have additional pre-1930's info.--let me know.

Robert J. Bryant
"EDITORS DESK"

Welcome Recumbent Cyclists,

Yes, you noticed, I changed the Newsletters name! The Recumbent Cyclist will cover the same topics as the old NWHPVA Newsletter. The main reason for the change is your Editors overwhelming interest in land HPV's of the recumbent design. I will continue to welcome any articles on Air-Land-Sea HPV's, maybe even an article on a weird upright bike once in a while. Over the next year you will notice even more changes, I will be doing new graphics and around the first of the year, laying out the newsletter on a computer. If this is your first issue, I

Continued on Page 11

Hudyn Vehicles
PO Box 22444
Indianapolis IN 46222

HPV "How and Why" Books written by Tom McGriff of Hudyn Vehicles

**Designing and Building the three wheel HPV, $32. postpaid
**Designing and Building HPV Composite Fairings, $32 postpaid
**Construction Plans for Building the Hudyn Vehicles, $32 postpaid

"Highly recommended", says Robert Bryant of "Recumbent Cyclist".

"FUTURE-BIKE, Cycling into the '90s" continued

air piped in, in the direction you are going, so you'd have a perpetual tailwind. Its quiet, its lightweight, and you could elevate it 20,40 or 60 feet in the air to eliminate hills." Now here is an Original thinker! Imagine a bike freeway from Seattle to Portland, STP in four hours!(ed.)

The same issue (Bicycle Guide, June '90) has a road test on the Alex Moulton ($4100) Speed.

In the June '90 issue of Bicycling Magazine, there was a review of the "Michael Browning First Edition", a new suspended upright bike from England (where else ?). The new bike is Campagnolo Equipped and sells for $2950.. Browning did not answer my inquiries, so if you want to read more about this bike, take a look at Bicycling Magazine. My sources tell me that Mr. Browning was said to have spent a lot of time in and around the Moulton Factory and Museum in Bradford on Avon, England. My source, who remains anonymous, says that the new Browning looks very similar to a rejected Moulton design ? Note: Alex Moulton also rejected the recumbent design...............  

Robert J. Bryant
RECUMBENT NEWS

RADIUS SPEZIALRADER Many of you have heard of the famed European suspended LWB recumbent. A local bike shop may become a dealer for Radius. If things come together, prices will be around $2000. for a complete bike - More later. INEXPENSIVE RECURBENTS? Milt Turner, Mr. Laid Back Bicycles, has a SBW recumbent called the LBB Jr. Built of mild steel-square tubing, and sells for only $318. complete! This could be the most inexpensive recumbent ever. Milt also has a Hi-Performance version, the LBB '90, made from chromolly round tubing that is currently available in frameset only for $396. Rumors persist that Milt sold out his first batch very quickly! For more information send $1 to: Turner Enterprises, PO Box 36158, Los Angeles CA 90036. FAIRINGS Gordon Mallett from Indiana builds Breeze-Eeze fairings. They are made for underseat-steering LWB recumbents of aluminum frames and nylon bodies. (in several colors) I have ordered one for the Millennium-Tailwind, so we'll see what they are like. They will sell for around $100. HuDyn it? I have found a great book on three wheel recumbent trike designing and building. 25 chapters and 80 pages, well worth the $32. post-paid price. It is like taking a college course in HPV design! Hudyn Vehicles, PO Box 22444, Indianapolis IN 46222. COUNTERPOINT PRESTO FANS Angle Lake Cyclery has sold out of the first batch of '90 Presto's. The second batch will be ten bikes, eight of which are still available. They are non-fold models. The frame only price is $899. Complete bikes are available starting from $1499. LONG-LIVE THE R OULANDT--yes, its true, the dutch Roulant is still being built. Contrary to earlier rumors that they had ceased production. CYCLO-PEDIA The famous build-it-yourself recumbent "Econ-Bent" has a new surprise, front suspension! DH-RECURBENTS University Cyclery in Houston Texas is building a LWB recumbent with a 56" wheelbase! (large frame size has a 60" WB) The DH looks like a cross between a Ryan and a Tour Easy. It has upright steering that comes up from the front derailleur tube (about mid-frame) via a stem extension and it has tourist type handlebars. The fork and stem are connected with a steering rod/linkage. The DH has a seat similar to the Tour Easy and it is mounted way far back. Prices start at $995. University Cyclery, DH Recumbents, 4007-G Bellaire BLVD, Houston TX 77025.................RJB

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The Counterpoint Presto Cont'd

Presto Specs:

Rims & Tires
Hubs
handlebars
Brakes
Brake pads
Derailleurs
Crankset
Freewheel
Shifters
Weight
Wheelbase

Sun Metal/ 20 X 1.5 or 1-1/8"
Suntour XCD 36H
Flared or altered "drops"
Dia Compe BMX or std. side pull
Aztec
Suntour GPX
Suntour GPX (chainrings 44/56)
Suntour GPX 12-26
Suntour Bar-Con 7spd
28 (non-fold), 30 (fold)
36.75"

The "Performance" option is also available ($1599), it includes: 20 X 1-1/8" Panaracer tires, Time-Sport pedals, higher gearing and Cinelli cork bar tape. A folding boom, front fairing and trunk are also available options.----RJB
The Futuristic "Flevo" is a Dutch SWB Recumbent with front wheel drive and rear wheel steering (yes, it's true!). The Flevo is also fully suspended through the use of rubber blocks. This is some Bike. I have had a very difficult time getting information on this vehicle.

--Continued from Page-9

hope you enjoy it enough to join up!

The next few issues will be very exciting! I am planning a Recumbent Building Plan Buyers Guide. Also, Human Power Editor, David Gordon Wilson is doing an exclusive article for my SWB Recumbent series. I'll bet you can hardly wait to read that!

Please keep me posted on your Fall projects. Pictures and commentaries will get published. Look for the next issue in Early November. If you know of anyone who would like a Sample Copy, please have them send a SASE, and we'll get one right off to them! Happy Pedaling,

Robert J. Bryant, Editor and Publisher

**FOR SALE: DeFelice Bitubular LWB 18 spd, drum brakes, rack, $550 obo, 206-632-8330** (WA)

**FOR SALE: Lightning Cycle Tailwind LWB, underseat steering, custom built. New cond. 206-255-9479** (WA)

**FOR SALE: ROULANDT Recumbent, good cond. $475, also misc. Roulandt parts. 206-232-3802** (WA)

**FOR SALE: Quadra-Ped hand and foot powered trike. Richard Rau built, three years old, 20" wheels and 60 gears! $1500. 503-638-4255** (OR)

"The Recumbent Cyclist"
Is Written, Edited and Published by Robert J. Bryant and Produced by Marilyn Bryant**Special Thanks to Steven K. Roberts and Dan Burdick for the article and artwork that originally appeared in "The Journal of High-Tech Nomadness"**
18 SPEEDS - ALL ALUMINUM - FOLDABLE

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