Edition 2 June 1995

Laid·Back

The Journal of the Australian Human Powered Vehicle Association

Laid•Back

Laid•Back is the journal of the Australian Human Powered Vehicle Association.

Editors: Sherri Prisk and Murray Dowling
Cover: Warwick Dunbar
Quality Control: Katrina, Mutti and <GaD>

Many thanks to all our contributors for this Edition.

The opinions expressed herein are the Authors' and do not necessarily represent the opinions ot the AHPVA.

Drop us a line!

All letters, articles and submissions are welcomed. Without contributors there wouldn't be a journal!

How to do it:

Send your submissions to: **Laid•Back**
PO Box 5035
Mordialloc VIC 3195
Australia

(Make sure you include your name and address)

You can also submit your submission on disk. It saves us much time during production. Please specify what software you used and whether IBM (preferred) or Mac. Also include a printed copy in case we can't read the disk. If you need your disk sent back, please include a stamped self-addressed envelope.

We are now online. Drop us some email at:

laidback@crs.com.au

What to write about:

Contributions can cover anything HPV-related including

- local rides and events
- tours and trips
- vehicles – construction and reviews

We'd love to know what is happening in your area.

How long?

Length of your submission can vary from 400 to 2,000 words and may be accompanied by clear photographs, diagrams, line drawings etc.

Describe your vehicle to us for "My HPV". Please send clear photographs (preferably black & white).

For articles in the "What's On" calendar please include the event date, contact details and a brief description (about 100 words) of the event.

ISSN 1323-434X Print Post Approved PP339119/00015

Contents

Subscription Details

Yes! Please send me the next 4 editions of **Laid•Back** magazine.

I enclose a cheque or money order payable to AHPVA or:

Charge my credit card *(please tick)*. ❑ Visa ❑ Mastercard

❑❑❑❑❑❑❑❑❑❑❑❑❑❑❑❑

Expiry Date: / Signature: .....

Note: Credit cards will be charged as ICMS (on behalf of the AHPVA)

Name: .....

Address: .....

..... Postcode: .....

Country: .....

Telephone: .....

❑	Australian Residents	$25.00
❑	New Zealand Residents	$30.00
❑	International Airmail	$40.00
❑	International Seamail	$30.00

All amounts are in Australian Dollars

Post this completed form to: **AHPVA**
PO Box 5035
Mordialloc VIC 3195 Australia

And Now ...

We saw a recumbent the other day. "So what?," you may ask. We actually see recumbents fairly often (or we wouldn't be producing **Laid•Back**). This time it was at the start of our usual morning commute. The number of recumbents we see on the road while riding is limited, but increasing. To actually see one while bleary-eyed at 6:45 AM on a weekday came as a bit of a shock. The fact that these three riders passed with merely a nod and a wave is an indication that this is not such an abnormal sighting.

Five years ago, we would have immediately leaned hard right and followed - stopping to compare notes about our vehicles and the few others we knew. We had occasionally met cyclists who had seen other recumbents, but never actually met any ourselves.

Does this mean that there are more recumbents now than five years ago? Yes, but more importantly, more of those vehicles are now being used for real transport. This is due to an increase in the ridability of vehicles, with more commercially produced HPVs and better custom-built designs. Home builders are improving their designs by learning from the good and bad features of existing vehicles

Our early morning companion had designed his SWB bike after examining many vehicles and talking to many people at the AHPVA Championships held at Sandown Raceway last year. This allowed him (and others) to avoid many mistakes and shortcomings and create a vehicle more suited to his requirements. The end result looks like a beautiful machine.

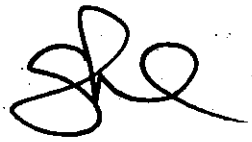
This edition of **Laid•Back** contains around fifty photographs of HPVs. Don't worry! You wont be the first person to read **Laid•Back** with a magnifier and protractor at hand.

You can help improve the quality of recumbents by telling us about what you did with your recumbent, what worked and what didn't work. Let others benefit from your experience by contributing an article with photos, sketches or plans.

Laid•Back can only be filled with ongoing contributions like these. We don't want to see this publication solely as a vehicle for the opinions of the editorial team. There are many options and opinions once you break the shackles of the UCI racing regulations. We seek to reflect the variety of views within the HPV community.

Many thanks to the many contributors for this edition.

Murray Dowling



Sherri Prisk

Record Breakers

by Murray Dowling

As predicted last edition, the HPV 24-hour record has surged past the 1,000 km mark. Riding a fully-faired carbon fibre M_5, Axel Fehlau from Germany managed to travel 1,021.359 km — adding around 45 km to the previous record set by Mhyee last August. Axel surpassed Mhyee's record with over seventy minutes to spare.

Axel had to abandon an attempt on the 24-hour record last year after 20 hours and 45 minutes. He had covered 827 km on a Leipzig velodrome, riding a fully-faired Aeroproject. At an average speed just below 40kmh, Axel was on target for the (then) record when he was forced to stop due to nutrition-related problems.

During his latest record ride, Axel also set a new record for the "Megametre" (1,000 kilometres). He reached that mark at 23:17:21.34. The previous record was 25:06:34 (also held by Mhyee). This epic ride came only three weeks after Axel broke the 12-hour record with a ride of 607.641 km (average speed 50.64 kmh).

These successful attempts took place on a 250 metre wooden velodrome in Buettgen near Duesseldorf, Germany. That's 4,085 laps in 24 hours - makes you dizzy just thinking about it! The bike used for both rides was built in The Netherlands by Bram Moens, European Champion and builder of the M_5 range of recumbents.

Bram had previously used the same vehicle for his own successful attempt on the one-hour record. Read about his attempt and check out this impressive vehicle later in this edition.

This is probably the first time that the one-hour, 12-hour and 24-hour records have been held by the same vehicle!

Congratulations Axel and Bram.

Readers Writes

Positive Responses

I really enjoyed Laid•Back. It was well written and beautifuly presented. Congratulations on a job well done.

Glen Stickley, Cooparoo, QLD

Great magazine. Keep up the good work!

Ken Bolch, Garfield, VIC

As any editor will tell you, it's comments like these that make all the effort worthwhile, especially for a brand-new publication like Laid•Back.

Radical Paddles

I am currently building a pedal powered catamaran which I hope will be a great improvement over the existing HPBs (human powered boats). I think there is great potential for an efficient, affordable HPB on the market.

The HPB I am building has the pedals drive a paddle wheel in much the same way as existing HPBs, however I have designed and am currently seeking a patent for a different paddle wheel design. Basically, the paddles travel around the central axis in a vertical plane rather than radial to the axis as in existing designs. This enables the paddles to enter and exit the water smoothly. As well, the angle of the paddle as it travels through the water can be designed to maximise the thrust. This results in an action which is very similar to the movement of a paddle when used by people paddling a canoe.

One of my problems at the moment is in locating parts, and I would appreciate a "Directory of Suppliers."

Max Mosig, Kambah, ACT

The problem of finding suppliers must be the most common topic mentioned in letters received. To alleviate this problem, we plan to produce the aforementioned Directory of Suppliers. Perhaps you want brake pads that make you go 37% faster? Yeah! Well so do we. We don't know where to get them either, but someone, somewhere knows where to get most obscure stuff. We call upon readers to send us details of the uncommon parts and materials and the suppliers who can provide these. Only with sufficient input will a Directory of Suppliers be worth printing. Please give generously!

Natural Design

Firstly, congratulations on being elected to the board of the International Human Powered Vehicle Association - it's good to have an Australian on the board.

I am writing with the aim of finding other human-power inventors and researchers to communicate with.

I have been a member of the IHPVA and the British Human Power Club for more than four years, and during that period worked on prototypes of land, water and air HPVs.

The research currently underway has been lateral or parallel to most research overseas. I am excited about the results achieved by our group, while at the same time frustrated by the lack of funds and facilities.

Instead of attempting to perfect existing HPV technology, we have gone back to basics - learning how fish swim, animals move and birds fly. What we have found is an unexplored area that has an almost magical simplicity, or common denominator. The common denominator being the wave patterns generated. Either they are correct or they are wrong.

HPVs for land, water and air should be designed according to the common denominator from nature.

Could you please put me in touch with any other HPV persons that have gone beyond conventional design. Swapping concepts and knowledge can speed up development work considerably.

John Clark, Bundanoon, NSW

Thanks John, for your congratulations. Murray is indeed on the board of the increasingly accurately named IHPVA.

If you would like to swap concepts with John, you can write to him via the AHPVA, PO Box 5035, Mordialloc VIC 3195.

Desert Disappointment

Our cart entered the Dubai Soap Box Derby on 10 March. We made it to the semi-finals at which stage a kingpin failed and caused the body to foul a wheel. We were, until then, the fastest team!

After repairs and modifications were done to improve the reliability, we took it to Bahrain this last weekend. We achieved pole position in the seeding time trials (out of 14 vehicles).

On day one of racing, we were unbeaten and the only team to get a sub-34 second time to post the fastest time of the day (33.98 s) in high wind conditions. Day two was to be very different! Calm and hot - perfect for our cart?

The first run was 33.67 seconds - faster than the previous day's best! The next run was our ladies team's first run of the weekend. They ran wide coming out of the bend and took a rather nasty cruise across part of the local desert. A spectacular sight which unfortunately destroyed the steering units. We attempted repairs, which failed and we were out of the competition.

So, all in all, not a very successful year for us.

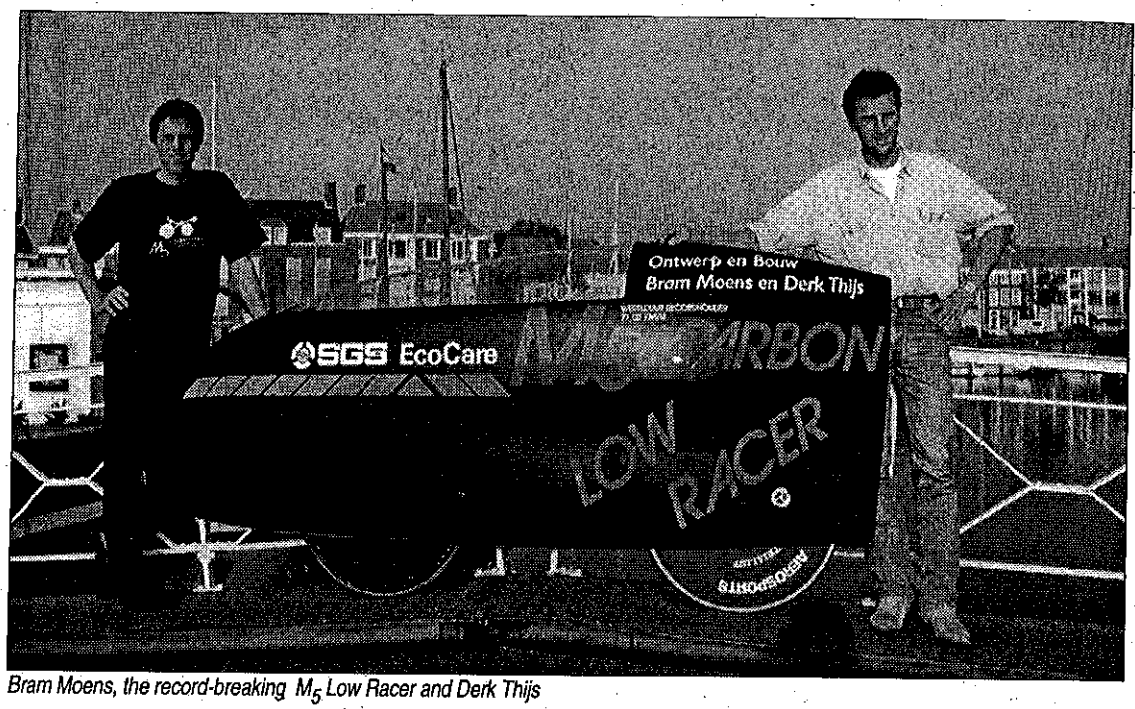
Some good news: Bahrain is considering a 24-hour pedal car race, based on the one in Hong Kong or perhaps the Aussie Pedal Prix.

Phil King, Dubai, United Arab Emirates

Sorry to hear your sad tale, Phil. This highlights the many aspects of racing, powered and otherwise, that are required to secure a victory. Weight, aerodynamics, steering, rider training and luck all have to be right. Somehow I doubt you will be giving up!

Another 24-hour event would be a welcome addition to the HPV calendar. Perhaps we should have a word to our fellow publisher, Rupert Murdoch, about syndicated rights to World Series 24-Hour HPV Team Races.

77.123 km in One Hour!



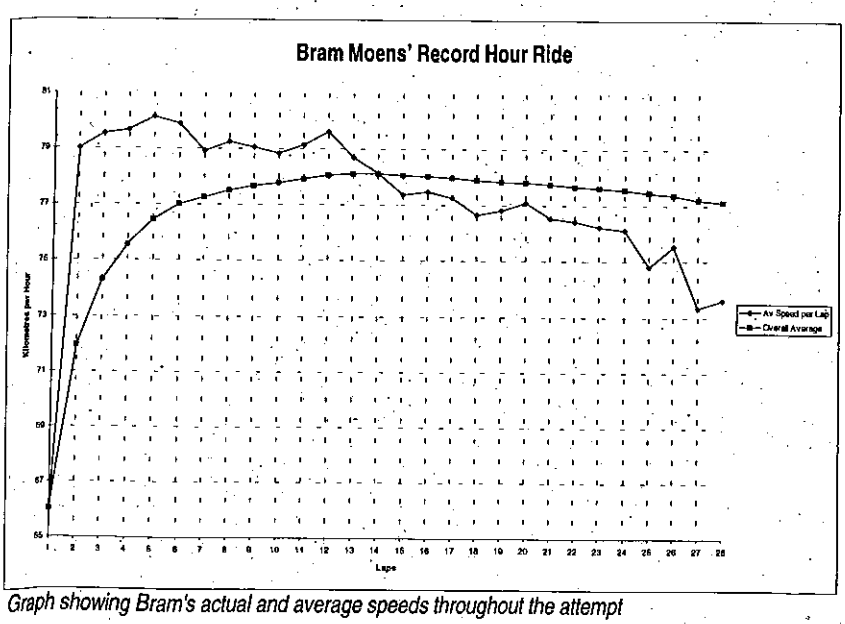
photograph courtesy b moens

Bram Moens, the record-breaking M_5 Low Racer and Derk Thijs

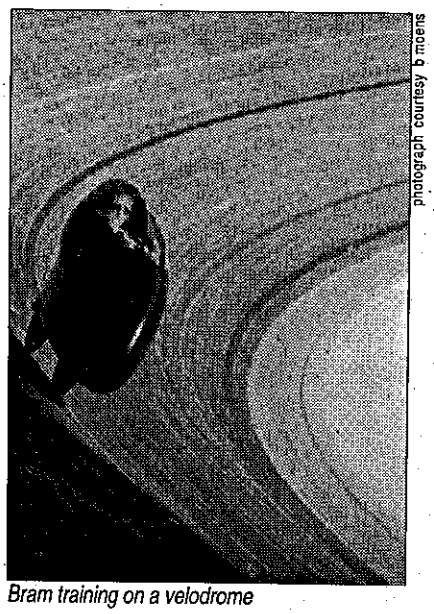
Bram Moens, 1994 European HPV Champion, rode 77.123 km in one hour on October 1, 1994. This incredible effort broke the previous record, set by Pat Kinch in 1990, by over 1.5 km. The vehicle Bram rode was an M_5 Low Racer, made of carbon fibre. It was designed and built by Bram Moens and Derk Thijs. The M_5 has a medium wheelbase, with a 26" front and a 28" rear wheel. The fairing is constructed of 100% carbon fibre and total weight of the bike including the fairing is 17 kg.

The record attempt took place on the high-speed car-tyre test track in Lelystad, The Netherlands. This 2.8 km track is at an altitude of minus 7 metres as it is situated on re-claimed land. (This track will also be used for a number of events at this year's World Championships.) The attempt was held in conjunction with the Dutch National Time Trial Championships.

Weather conditions during the record ride were as follows:	
Windspeed:	< 0.1m/s
Temperature:	13ºC
Air Pressure:	1022 mb
Air Humidity:	82%



Graph showing Bram's actual and average speeds throughout the attempt



photograph courtesy b moens

Bram training on a velodrome

Soapbox Racing in the Desert

by Phil King

The task is to construct a vehicle that will carry two persons (driver and passenger) downhill as fast as possible with no means of propulsion other than gravity.

Vehicles must have a minimum of four wheels, with brakes on at least four wheels. The vehicles must be no more than 1.5 m wide and have adequate steering via wheel or tiller system. There are no other restrictions.

The event races one cart against another in a knockout contest over a series of heats, semi-finals and finals.

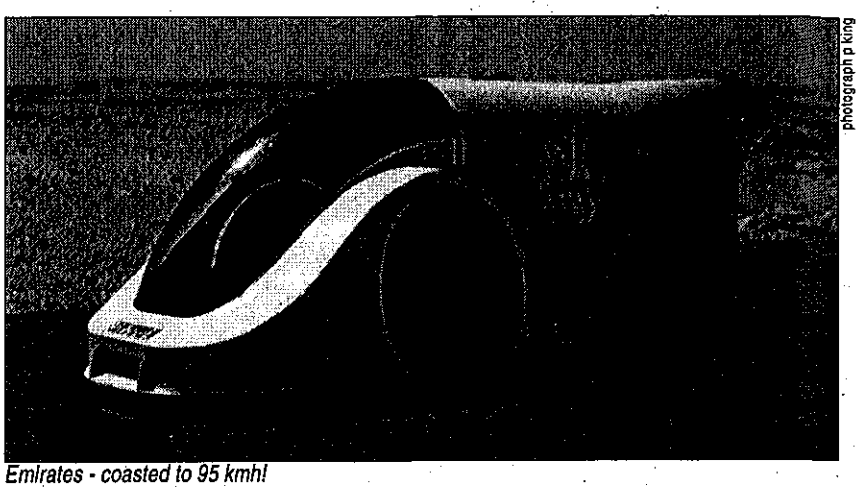
As can be seen, with so few regulations it is open house to those of us who have innovative and inventive minds.

The biggest problem for any team wishing to take part in both rounds is differences between the two venues.

Dubai is so flat that a wood and scaffold ramp has to be constructed to ensure that all carts will make it to the end of the 300 m course - even then some vehicles don't make it! Not only is a ramp required but a push-start is a very necessary part of the event.

"Dubai is so flat that a wood and scaffold ramp has to be constructed"

Bahrain, on the other hand, has a steep run of some 800 m and requires only a release of the brakes to initiate a fast acceleration and surprisingly high top speed.



photograph p king

Emirates - coasted to 95 kmh!

Emirates, the International Airline of the year in 1994, entered this event for the second year in succession — only this time with a very different machine to what had previously been seen on the hills.

Because of the ramp design, Dubai favours a short wheel base cart — at 1.15 m *Emirates* have one of the shortest.

Prone carts are not new in Bahrain, however, *Emirates* were the first to try it in Dubai.

To build such a short cart and have a prone pilot took some thinking. The passenger was eventually positioned on a seat in the fully supine position above the pilot! This gives a very compact cart with an overall length of 2.4 m and overall width of 0.65 m. A frontal area of 0.3 m^2 gave reasonable aerodynamics.

The motive force for these carts is gravity, the vehicles' weight providing the potential. What seems a simple science has grown men playing around in the sand all day (sand is one thing we have lots of!). Placing bags of sand inside and sometimes outside of the cart to fine tune the weight is often seen as a black art. *Emirates* got over the problem by constructing the cart around a ballast tank designed to take sand or water, although the empty weight was considered too heavy at the end of the day.

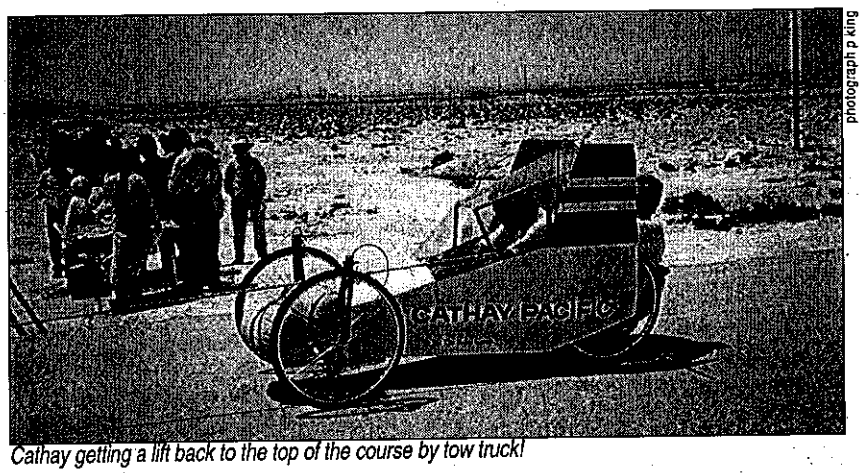
Dubai Country Club - Round 1. The excessive weight and lack of muscle power in the push-start caused *Emirates* to be beaten in the heats by the eventual winner of the men's, women's and family trophies: *Mike Lawson Associates*. Mike's cart is a beautifully home built, open top machine, constructed from plywood and ideally suited to the Dubai course.

Mike Lawson Associates has won the Dubai event more times than any other team and is quite rightly known as Dubai Champion.

Visiting Dubai were *DHL Bahrain*, whose carts are always well turned out and sport the latest in high-tech equipment.

DHL's 1994 model was equipped with racing wheelchair hubs laced to US Federation Soap Box rims and 160 psi tyres. To stop this cart there were hydraulic discs all around!

Emirates suffered many teething problems and would rather forget the Dubai event altogether.

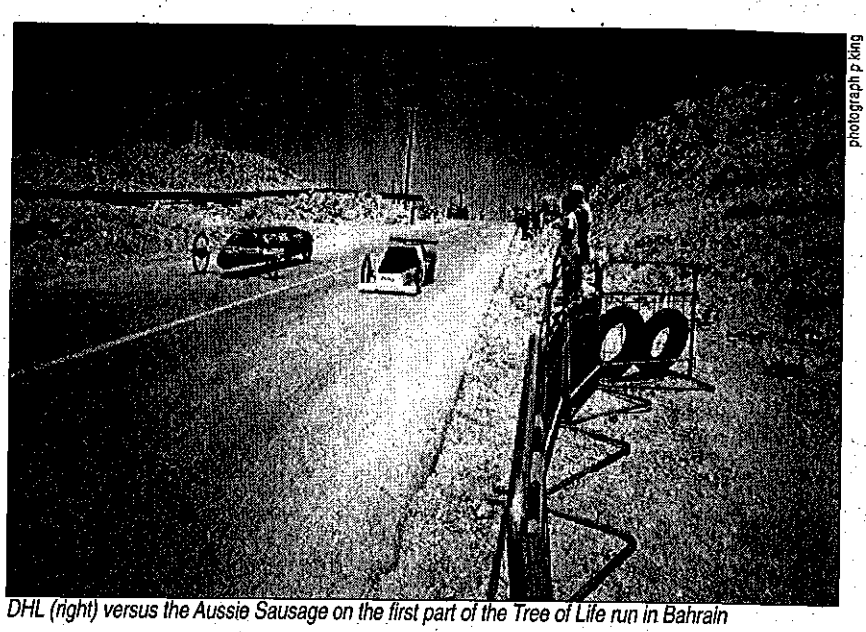


photograph p king

Cathay getting a lift back to the top of the course by tow truck!

The only real battle all day was between *Mike Lawson Associates* and *DHL Bahrain*. *Mike Lawson Associates* won and *DHL Bahrain* had to settle for second, having won in 1993.

The gauntlet had been thrown down for the real event of the year at the Tree of Life in Bahrain.


photograph p king

DHL (right) versus the Aussie Sausage on the first part of the Tree of Life run in Bahrain

Tree of Life, Bahrain - Round 2. The Tree of Life, so called because it grows alone while all around dies through lack of water, provides an excellent venue for this form of short course event.

Three weeks separated the Bahrain event from the one in Dubai. The *Emirates* team had used their time wisely and were able to rid their vehicle of most of it's various teething problems.

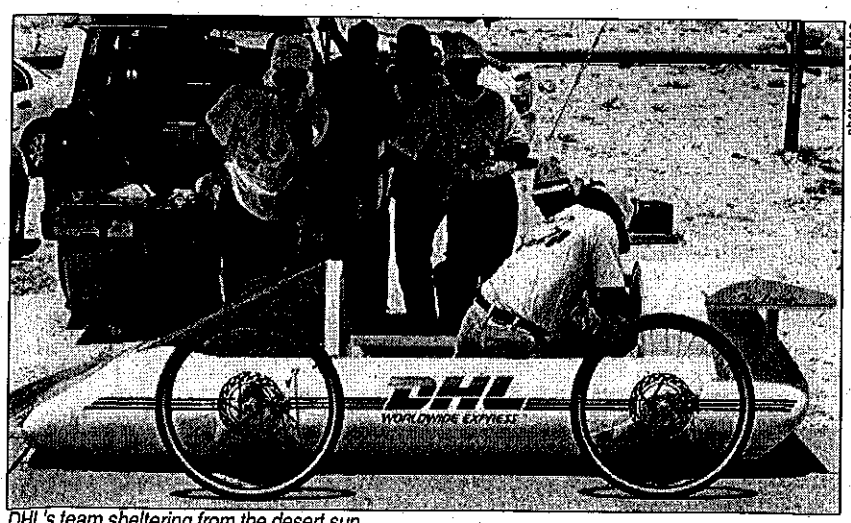
"It was fate that these two carts should be pitted against each other for a trophy"

The event staged over two days was Bahrain's 10th Anniversary of the event and the slick organisation reflected the experience gained in those years. Electronic timing, courtesy of DHL, caused a stir when it revealed that *Emirates* had pole position in the time trials with a terminal speed of 95 kmh.

Unfortunately one of the teething problems struck again, in the form of a dragging brake shoe on one of the Sturmey Archer Elite units, which cost *Emirates* the race against *The Aussie Sausage* (named after the sponsor who supplies the island of Bahrain with Australian meat). The Aussies went through the two days without losing any significant races and went on to win the Open Trophy.

The last race of the event was to be for the International Trophy. Originally planned to be given to the fastest visitor, the local Bahrain teams wanted to be in with a chance! The end result was for the fastest Bahrain team to race the fastest overseas visitor - not necessarily the highest placed, but the team with the fastest run of the two days. As it happened *The Aussie Sausage* proved to be the fastest Bahrain team and *Emirates* were the fastest visitor.

It was fate that these two carts should be pitted against each other for a trophy. Running an event on a knockout basis often means that the final may not include the two fastest carts in the event, only the fastest of each group of carts! *Emirates* had recorded the fastest in the pole position time trial, fastest on the first and second days — only reliability problems stopped them from winning the Open Trophy.



photograph p king

DHL's team sheltering from the desert sun

The International Trophy race was held over two legs, to eliminate any disadvantage due to a bend to the right mid-way down the course. The race was hard fought: *The Aussie Sausage* trailed *Emirates* by only 0.15 seconds on the first run. The second run had *Emirates* again passing the line in first place, this time by 0.32 seconds to the cheer of 1,000 plus strong crowd that had hung on to see this duel between the two fastest Soap Box carts in the Middle East.

The *Emirates* team, who are all 18 year old first year apprentices studying aircraft mechanics, were well pleased to be return-


photograph p king

Ouch! 300kg on cheap steel rims! Proof that bike wheels don't like sideways forces.

ing home to Dubai with the title of "International Champions 1994"! The boys learnt many things about vehicle dynamics and construction techniques but, above all, they learned teamwork and preventative maintenance. Two very important lessons for those embarking on a career in aviation.

Had they carried out correct inspections between each run, the result against *The Aussie Sausage* in the heats could have been a different story — that mistake cost them the Open Trophy. However 1995 is another year!

Both events are charity fund raisers, organised by the Dubai and Bahrain Round Table Organisations respectively. The Round Table are an internationally well known group and we here in Dubai thank them for their continued interest in staging an annual Soap Box Derby.

The cart is based on a square section steel tube chassis of simple 'T' shape platform, the wheel hubs are mounted on adjustable rod-end bearings to permit adjustment of camber and toe of both front and rear wheels. By turning one of the rod-ends through 90°, adjustment of castor could have also been achieved, however it was felt to be an unnecessary complication.

Steering uses a simple triathlete bar which rolls from left to right, connected via adjustable tie rods to the front wheel steering arms. This bar set-up was deemed the most comfortable for a prone driver, enabling some weight to be taken by the bar armrests and not all on the chest.

By far the most interesting feature of the cart is its aerodynamics. The shape of the cart wasn't designed anywhere, it just evolved! The chassis and floor were available, the pilot and passenger installed and a minimum body shell built around them. It all started with the canopy — a beautiful piece of work by Zzip Designs, makers of many HPV windshields and suppliers to many of the world's leading HPV manufacturers. Karl Abbe, proprietor of Zzip Designs, has been very helpful to *Emirates* in their quest to build their soap box cart, even to supplying the tinted Lexan instead of the normal clear. Out here, tint is very important when racing towards the setting sun.

The body shell is mostly aluminium sheet and formed using simple curves as compound curves are a little too tricky for first year students. The result is a pleasing shape although aerodynamically, the stepped sides do cause some breakaway at the boundary layer and disturb the laminar pattern.

Constructing the soap box cart is somewhat easier than the average HPV. For a start, there is no drive train to worry about. Light weight is not as important as correct weight — within reason the steeper the gradient the more weight is required. Of course, more weight equals more inertia, which results in slower acceleration but higher top speed. If maximum speed is achieved at the finish line the weight is perfect; if the cart is still accelerating it is too heavy and if it reaches maximum speed before the finish line it is too light.

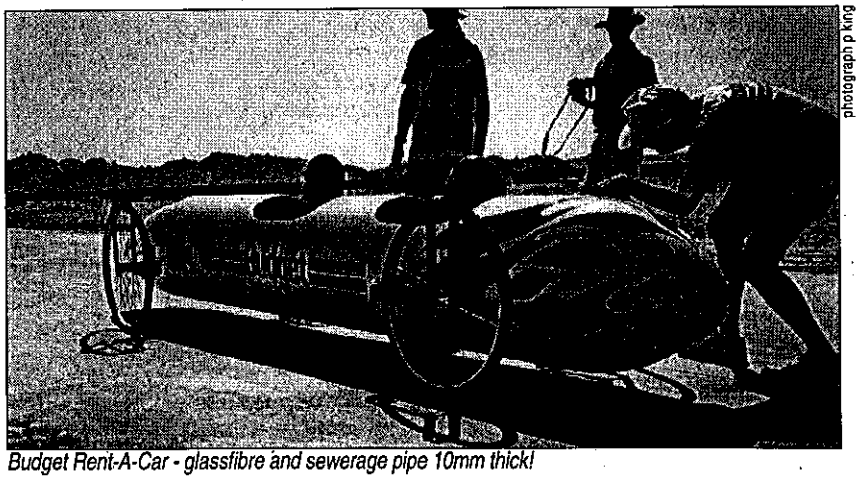
Keeping the rolling resistance to a minimum is an obvious way to improve potential speed. Good wheels, hubs and tyres that offer high pressure/minimal footprint are a must. Because a soap box is only used over a short distance, bearing grease is replaced with a water dispersant light oil. On top of all this and even on the slow flat track of Dubai, aerodynamics have the biggest advantage and yet *Emirates* is the only team to have attempted streamlining the wheels.

1995 will be used to develop some other ideas on the same chassis and 1996 will see the embodiment of all that is learnt into new designs that will have other soap box teams wondering why they hadn't thought of it first — and wishing they had.

Emirates is "the shape of the future!". Not only an airline going places, but a soap box team looking for new and interesting competitions.

Go on! Take the kid's Billy Cart and come racing in the Middle East - or better still send us an invitation and we'll come to you!

***Phil King** is Training Officer for Emirates Airlines and is based in Dubai.*


photograph p king

Budget Rent-A-Car - glassfibre and sewerage pipe 10mm thick!

A Progression of Ideas
FWD Lean Steered Trike

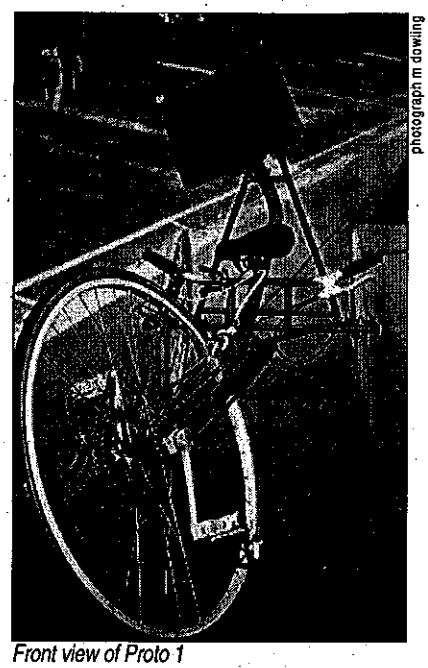
by Ross Harrop

It began as one thing and ended up another. The age old challenge of building a rear wheel steered bike provoked me to start on an uncharted path. My original proposal consisted of a short wheel base recumbent design with under seat steering to the rear wheel and power transmitted to the front wheel.

After reading of the many attempts by universities to build such bikes it became clear that balance and steering set up uncomplimentary forces which promptly dismount you. I abandoned this project after almost completing the frame.

Back to the computer [another diversion - learning a CAD program]. After pondering many bike configurations I settled on a front wheel drive (FWD) trike with the crankset geared and centred in the front wheel.

I didn't want rear steering with its abovementioned habits, plus the fact that to avoid objects your wheels must first head off in the direction of the very thing you wish to avoid. Tempting disaster, hey?

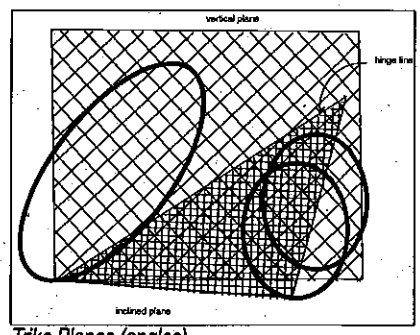


photograph m dowling

Front view of Proto 1

Problem 1: Gearing

The wheel centre gearing is a good idea, but creates too many headaches! I opted for a more conventional derailleur setup. Power is transmitted along the right side of the trike via the crankwheel to the derailleur, across the double sided track hub to the left side chain, which then drives a fixed hub sprocket on the front wheel. Freewheeling is by way of the gear cluster, however the left chain is always moving when the wheel is rotating. The front axle locates 4 bearings, locates hub and pedal arms and supports frame.



Trike Planes (angles)

Problem 2: Steering

When cornering on a bike, you turn the handle bars slightly and lean a lot, varying with speed and road camber. Idea! If I could combine these two angles into a compound angled plane I would have steering. Eureka! By drawing a vertical plane rearward from the front wheel, intersecting it with a compound plane originating from the ground point of the front wheel this then creates the hinge line on which the trike turns.

The front wheel leans and turns and you must do the same when pedalling. The seat is also on this frame unit. The second frame is pivoted behind the seat and just behind the derailleur. It also comprises the two rear wheels and a fixed handle bar unit.

Good points

- Room for touring luggage on rear frame. Mounted low, it would possibly make for improved stability.
- Easily mounted and dismounted.
- Seated at eye level with car drivers.
- Shorter, and almost as narrow as a bike.

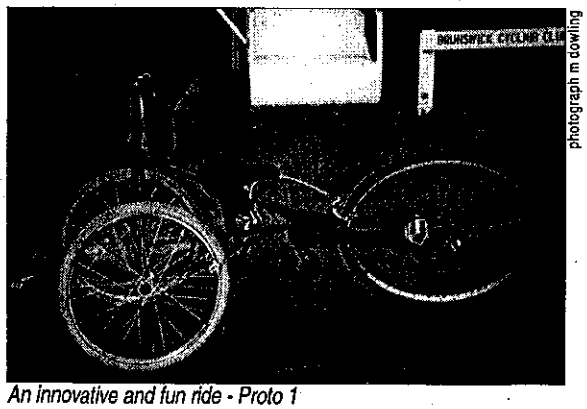
Shortcomings

- Affected by road cambers of 6 degrees or more, wanting to climb up them.
- Front wheel can spin on steep hills and wet roads.
- Standard brakes can lock up rear wheels causing instability.
- Begins to be unstable at speeds above 15 kmh.

Although the trike didn't set the world on fire it does turn a few heads and still poses a few questions.

Specifications:

Overall Length	1660 mm	Maximum steering setup angles	
Track	600 mm	Turn	17 degrees
Wheelbase	1050 mm	Lean	26 degrees
Seat Height	600 mm	Hinge Line *(up and to the rear)*	30 degrees
Turning Circle	6.4 m		
Front Wheel	27 x 1.25 inches		
Rear Wheels	20 x 1.25 inches		
Gearing	27 to 65 inches		



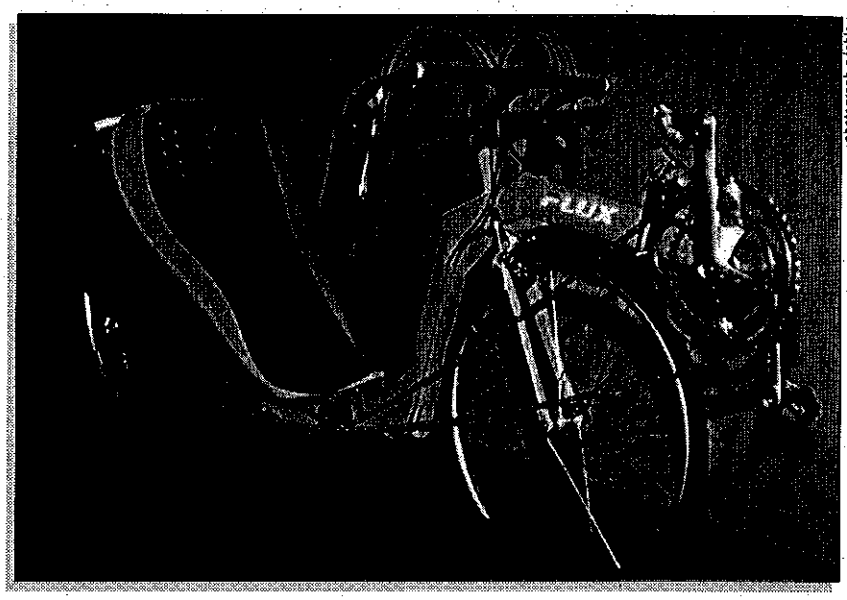
photograph m dowling

An innovative and fun ride - Proto 1

European Postcard

by Gunnar Fehlau

Flux Lowrider



photograph g fehlau

Flux founder, Christian Uwe Mischner started designing recumbents in the late 1980s. He started his production company in 1990.

The Flux Lowrider is a rear wheel drive bike and has a seat height of only 25 cm. It has a 26" rear wheel and a 20" x 1 1/8" front wheel. The handlebar setup uses a straight bar with custom built bar-ends onto which grip shifters are mounted.

This vehicle is built for speed - many European races allow tail fairings in the unfaired class.

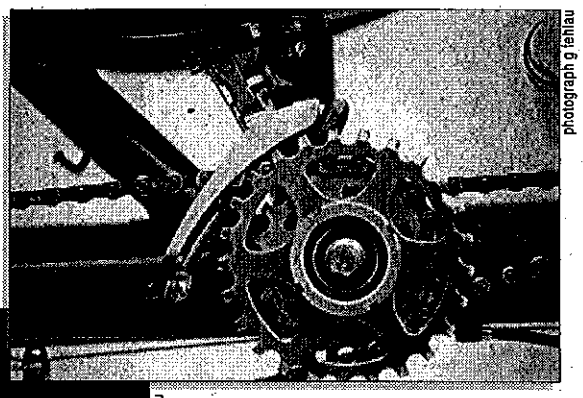
The Flux Lowrider is a high-end production vehicle costing DM6,000 - this includes the tail fairing/seat combination.

Aeroproject L2

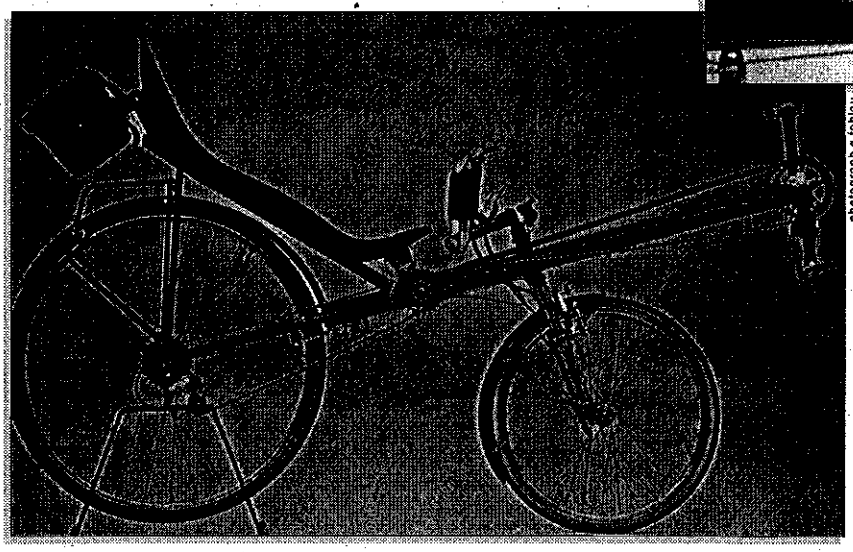
This short wheel base bike (89 - 101 cm) is one of the most wanted recumbent bikes in Germany. It has direct "under leg" steering, front suspension and a very recumbent moulded seat. It is a high quality German sporting recumbent with a light, stiff frame (total mass 11.5 kg).

To keep the clean lines of the Aeroproject L2, Manfred Harig, builder, has placed an intermediate drive under the seat. He also builds his own lugs for the frame which you can see to the rear of the derailleur (See inset). A beautiful machine.

The frame kit comprising seat, frame and fork costs DM1,800. I would like to call it "the Colnago of recumbents". The L1 model comes without the intermediate drive.



photograph g fehlau



photograph g fehlau

European Postcard was compiled by Gunnar Fehlau. Gunnar is the author of "Das Liegerad" a book devoted entirely to recumbent bikes. An English version of this magnificent book is due very soon.

For those of you interested in foreign exchange one little Australian dollar coin will buy around 1.05 Deutschmarks.

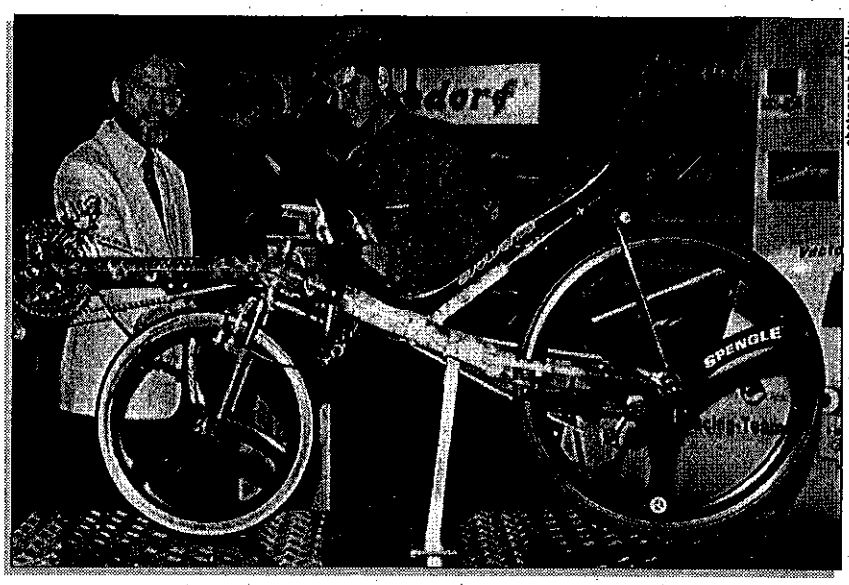
Aeroproject Sport

The Aeroproject Sportframe is built especially to be ridden fully faired in the Canard fairing. This particular model is a high-end version built for the cycle fair "Eurobike" held in Friedrichshafen.

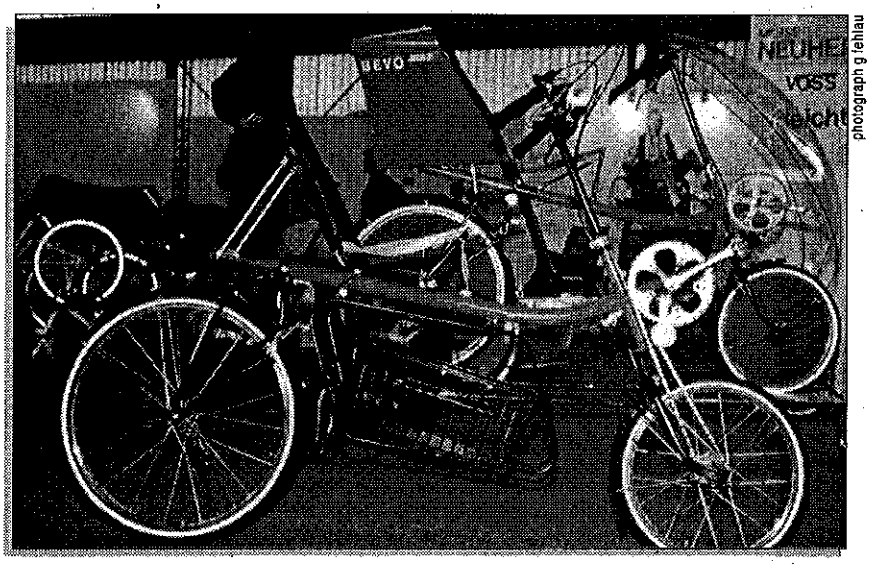
The 20" Tri-spoke front wheel (we have been waiting all our recumbent life to see and purchase such a smart product!) is still a prototype but might well be in production by the end of 1995 (fingers crossed).

This bike has front suspension and underseat indirect steering as well as a great purple and white powerdercoat paint job!

When this vehicle goes into production, you will be looking to pay around DM7,000 plus an additional DM500 for the powdercoat paint job.



photograph g.tehlau



photograph g.tehlau

Bevo Bike

The Bevo Bikes are made by Voss Spezialrad and designed for everyday use. The frontwheel drive needs more weight on the frontwheel - this current version is only useable on flat roads. The practical luggage case suspended between the front and rear wheels make steering easy.

You can expect to pay DM2,500 for this bike. Optional extras include tail fairing, front fairing and disk wheels (as seen on the bike behind).

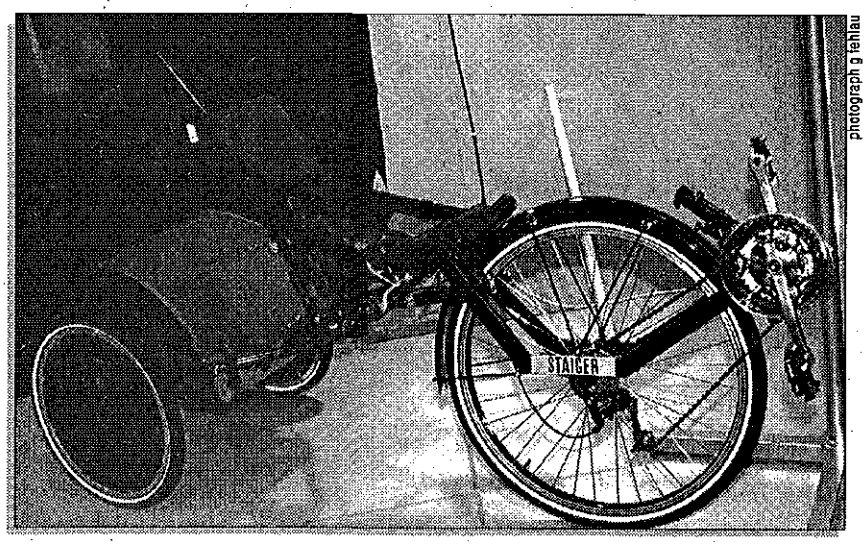
Staiger Trike

Staiger is a German company in the traditional upright bike business. However, a year ago they showed their first recumbent. It was a single track bike with a steering system similar to the Dutch Flevobike.

At the 1994 IFMA, Staiger started to offer three models including this transportation trike.

The trike is front wheel drive and front wheel steered. The rider has underseat bars which are used for gear and brake levers only - steering is done by shifting your bodyweight.

The trike has a padded, webbing bucket seat. It also has a large luggage carrier mounted between the rear wheels.



photograph g.tehlau

"White Upright" Wins Challenge

by Sherri Prisk

Congratulations are definitely in order to the HPV Challenge organisers. Wayne Kotzur, Annemarie Driver, Bonnie McDonald, Damien Clarke and his computer system and a multitude of ACT HPV Club and Pedal Power ACT volunteers combined to make the 1994 HPV Challenge one of the most successful and enjoyable.

A total of 36 entrants from SA, VIC, NSW and ACT enjoyed this fun weekend of competition, making it the largest Challenge so far. It was especially good to see so many new faces, particularly among AHPVA members.

For the first time not only was the Challenge sponsored but so was each event. Damien Clarke had done a magnificent job of securing sponsorship from local bike stores Hammer & Cycle, Bikecologist, Canberra Cycles, Big B Erindale and Lonsdale Street Cyclery together with the Canberra Bicycle Museum, Energise Sports Drink and Greenspeed. Approved Systems supplied the computer equipment for the weekend.

There was a large range of vehicles this year. So, alongside the production bikes and trikes there was a range of home built vehicles including some innovative home conversions. Harry Gordon (NSW) rode his front wheel drive, front wheel steered bike converted from a Raleigh Shopper; Greg Rich (NSW) rode a 1970s Dragster/SWB ASS conversion with a brilliant solution for seat suspension - an inflated innertube laced to the seat back; and Wayne Kotzur (ACT) showed his trike made completely of golf club shafts.

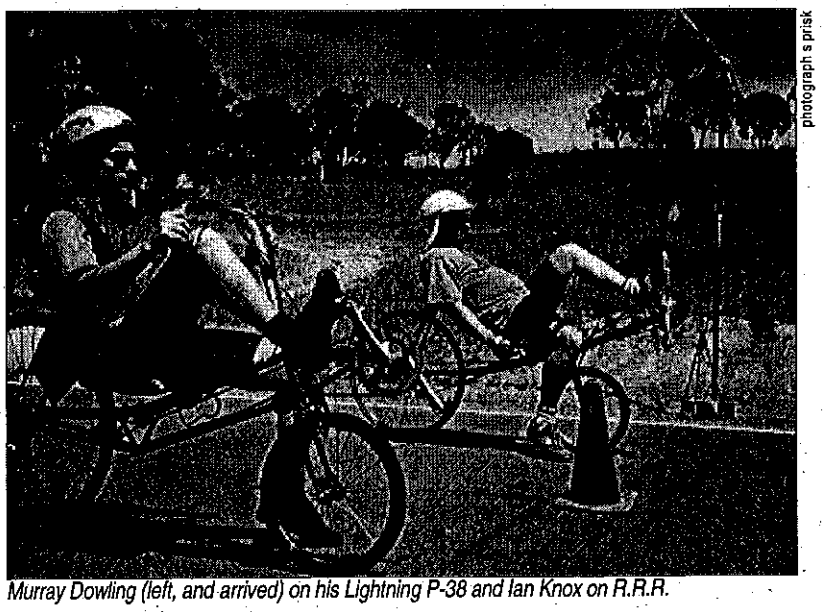
Thomas Herbst (VIC) had his German *Radius 16V*. *Chimay* an elegant LWB bike graced the circuit this year with a 'team' of riders - Roger, Nick and Cath (VIC). There was also a team of white trikes from Lake Tuggeranong College (ACT) with vehicle names such as *Sadistic Executioner* and *Viper*, who were testing their vehicles for the 24 hour RACV Energy Breakthrough (*More on that event next edition. Ed*). Mark Wroe was riding one of the original Greenspeed bikes, Geoff Osborne returned again with his *Brazen Hussey* and a new pair of bike shorts, along with Paul Sims who was on an upright Greenspeed bike. Peter Holloway had a new version of his SWB bike with front suspension which proved to be a welcome asset in the Enduro. Murray Dowling returned with his *Lightning P-38* SWB bike; Wayne Kotzur rode his SWB bike (which debuted at Sandown); Chris Curtis rode the only faired vehicle at this year's Challenge — his trike C7; Kath Cooper and Ken Wilson teamed up on their *Counterpoint* tandem along with Trevor and Steven Driver on their version of a semi-recumbent tandem.

photograph s prisk

Paul Sims, Challenge Winner, on his Greenspeed "White Upright".

Not only had the number of competitors increased, but so had the spectators. A family of three had ridden more than 100km from Braidwood on their Greenspeed tandem trike with trailer, meeting up with their neighbour who had also cycled to the event. Quite a number of Sydneysiders also came over for a look-see.

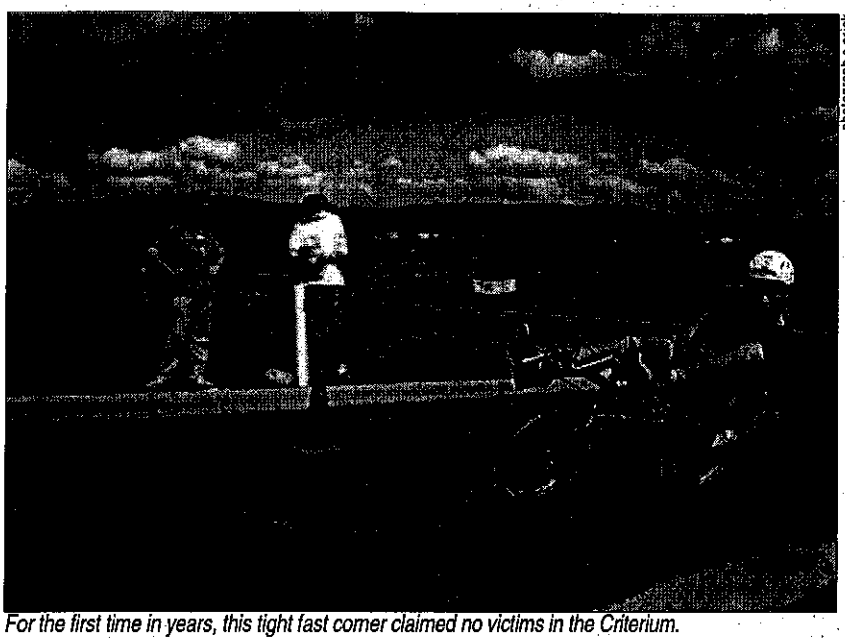
There was the traditional display of vehicles from the Canberra Bicycle Museum, along with a range of trikes from Greenspeed and a prototype carbon fibre and kevlar trike frame from Billspeed Industrial Design. This impressive and very lightweight frame certainly turned a few heads and Bill Shelley was kept busy answering questions throughout the weekend.



photograph s prisk

Murray Dowling (left, and arrived) on his Lightning P-38 and Ian Knox on R.R.R.

Events started with the 100 m Slalom. Richard Philpott riding *Viper* triumphed through the cones with Murray Dowling on his *Lightning* a close second and Jason Smith on *Bodycount* third.


photograph s prisk

For the first time in years, this tight fast corner claimed no victims in the Criterium.

The 200 m Drag was the next event with Paul Sims on his *White Upright* the victor, closely followed by Ian Knox on *R.R.R.* and Harry Gordon on *Hooli Bbrigula* third.

The morning's third event was the Hill Climb. A gruelling short sharp climb saw Paul Sims emerge as king of the mountain, closely followed by Murray Dowling and Peter Holloway.

After such an intense effort, the Descent was welcome relief. A team effort by Roger, Nick and Cath (I'm not sure who was riding), saw a distance of 1,016 m coasted, followed by Harry Gordon's 1,011 m and Sherri Prisk at 959 m.

Once everyone was safely down the hill, it was declared time for lunch. Those that were competing in the Enduro had time to modify their vehicles before massing again at the top of the course.

The Enduro event changed the speed emphasis of the weekend to one of more practical orientation. Racing across the rough terrain, many riders had that crazed look on their faces which you usually see only on downhill MTB racers. Careering across the clay and grass did take its toll on a number of vehicles. Several punctured, whilst others just took it rather gently (considering there was still over one day of racing left).

"riders had the crazed look you see only on downhill MTB racers"

Paul Sims on his upright (including knobbly tyres and front suspension) cleaned up the course, followed by Ken Rubeli on *Farcycle* (his Bickerton aluminium folding bike with 14" wheels). Harry Gordon ploughed through to come in at third place.

Leaving some time for tyre changes and running repairs, the Junior Criterium was won by Lawrence Bracewell, closely followed by Ben Crutchett and Katina Curtis.

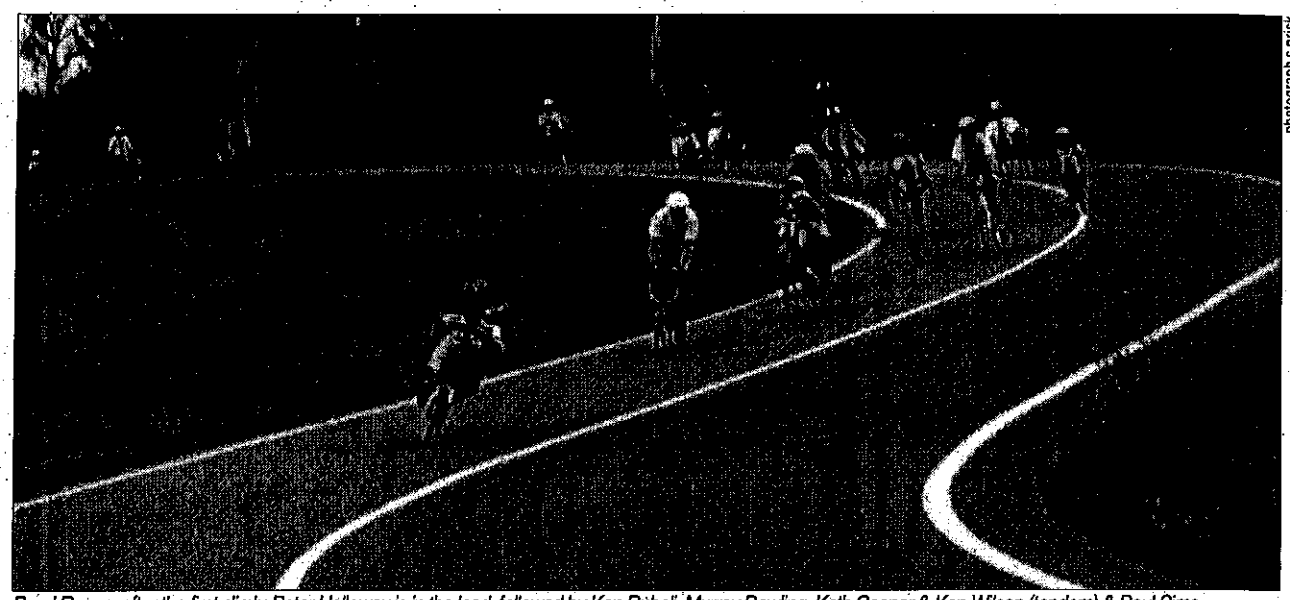
The Open Criterium was run in heats with the first few placegetters going on to compete in the final. In this short twisty course, tactics and initial position play a crucial role. Because of the narrowness of the track and the speed of the riders, the sprint to the first corner is fast and furious. Murray Dowling proved that he could not only stay on his bike but also take out the final, closely pursued by Ken Rubeli and Peter Holloway. The racing however, had not finished for the day.

The closed circuit of the Sutton Road Driver Training Centre is excellent for a Time Trial event. This event was pioneered at the Sandown circuit last year, and proved to be a great test of strength and speed for the Challenge competitors. The circuit is around 2.5 km in length and is mostly hilly. Peter Holloway completed the single lap with the fastest time of 3 minutes 53 seconds, followed by Ken Rubeli at 4:06 and equal third Paul Sims and Murray Dowling at 4:15.

After the presentations, competitors and spectators made their way to the refur-


photograph s prisk

A Greenspeed Tandem trike with trailer that was ridden 100 hilly kilometres to the Challenge


photograph s prisk

Road Racers after the first climb: Peter Holloway is in the lead, followed by Ken Rubeli, Murray Dowling, Kath Cooper & Ken Wilson (tandem) & Paul Sims

bished Downer Club for the traditional Saturday night dinner which was, as usual, a social affair. Actually, being at the Downer club at that time certainly was a good move, as it began to rain torrentialy, drenching everything. By the time dinner was over, the rain had started to clear — much to the relief of those who had ridden their vehicles to Downer.

Sunday dawned drier than expected. The first event for the day was the 200 m Sprints. Flying through at a top average speed of 56.56 kmh was Peter Holloway. Steven and Trevor Driver rocketed through the timing traps on their tandem at 54.09 kmh followed by Harry Gordon hot on their heels with an average of 54.05 kmh.

After a short break the Road Race began in pleasant overcast weather — perfect conditions for at least 40 minutes of hard slog. Some riders had prepared a pit crew (family or friends) who were at the ready with spare water bottles - although the effectiveness of handing a stationary water bottle to someone travelling in excess of 35 kmh can be disputed!

Peter Holloway once again lead all the way followed by Paul Sims. Murray Dowling stayed in third place after the first lap and this made up the final placings.

The Shopping Event was changed from last year, successfully avoiding the amusing congestion at the 'shop'. The event was held in pairs. Competitors raced each other to get to the 'shop' across bitumen, gravel and down a gutter, then carry the maximum grocery load up a steep slope (requiring competitors to change down into their lowest gear and then some!), pass the timers and return the goods to the shop to complete two laps.

All spectators had a great view of this open course. It was a good test of both vehicle and rider as the different road surfaces coupled with such a steep slope at the end saw quite a few upsets. Murray Dowling won the shopping event from Steven & Trevor Driver and Chris Curtis.

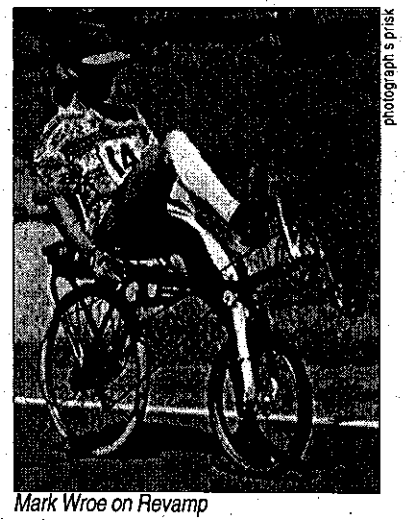
The final presentations on Sunday afternoon saw Paul Sims take home the Challenge trophy again (last year he rode his Grasshopper SWB to victory). Murray Dowling came in second place, Peter Holloway in third and for the first time there was a tie for fourth place between Ken Rubeli and Harry Gordon.

Congratulations to all competitors and organisers. Perhaps I'll see you again this year?

Turn to What's On for details of this year's Challenge.


photograph s prisk

Nick powering Chimay through the sprints


photograph s prisk

Mark Wroe on Revamp

1994 HPV Challenge Results

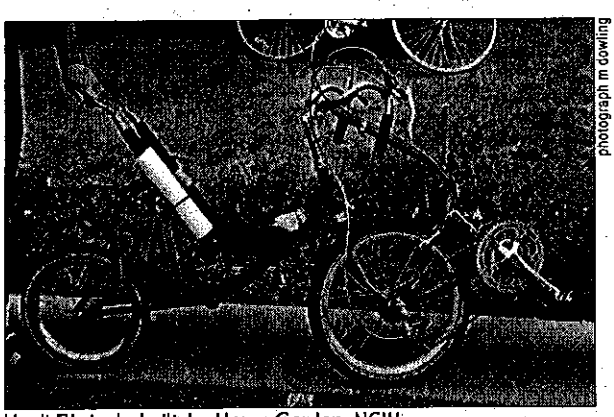
No:	Vehicle Name:	Rider Name:	Road:	Crit:	Climb:	Down:	T/Trial:	Shop:	Slalom:	Sprint:	Drag:	Enduro:	Prac:	Extra:	Total:	Place:
12	White Upright	Paul Sims	9	5	10	4	8	6	8	6	10	10	9	2	87	1
3	Lightning P-38	Murray Dowling	8	10	9	4	8	10	9	4	4	-	4	-	70	2
34	Tailwind	Peter Holloway	10	8	8	-	10	4	4	10	4	4	6	-	68	3
5	Farcycle	Ken Rubeli	6	9	7	4	9	4	-	4	4	9	4	2	62	4
24	Hooli Bbrigula	Harry Gordon	4	7	4	9	5	-	5	8	8	8	4	-	62	4
43	Semi Recumbent Tandem	Steven & Trevor Driver	4	4	4	6	4	9	4	9	4	7	4	-	59	6
8	Exit	Karl Nissen	7	4	5	4	6	4	4	4	4	4	8	2	56	7
16	C-7	Chris Curtis	4	4	4	4	4	8	4	4	4	5	7	2	54	8
1	Trusty Rusty	Wayne Kotzur	4	4	4	4	4	4	4	5	4	4	4	-	45	9
10	Junior Greenspeed	Ben Crutchett	-	9	4	4	4	4	4	4	4	4	4	-	45	9
11	On Loan	Roger, Nick & Cath	-	4	4	10	-	4	4	4	4	4	4	2	44	11
6	Radius 16V	Thomas Herbst	-	4	4	4	4	4	4	-	4	4	10	-	42	12
7	Counterpoint Tandem	Kath Cooper/Ken Wilson	5	-	-	4	4	5	4	4	4	4	4	2	40	13
9	Howie	Stephen Howe	4	4	4	4	4	-	4	4	4	4	4	-	40	13
4	Chimay	Roger Tarran	-	4	4	4	-	4	4	4	4	4	4	2	38	15
41	R.R.R.	Ian Knox	4	4	4	-	4	-	4	7	7	-	4	-	38	15
26	Brazen Hussey	Geoff Osborne	-	4	6	-	-	4	4	4	4	4	4	-	34	17
30	Body Count	Jason Smith	-	4	4	-	-	-	7	-	9	6	4	-	34	17
29	Sadistic Executioner	Michael Hill	-	4	4	7	-	4	4	-	4	-	4	-	31	19
14	Revamp	Mark Wroe	-	6	-	4	-	7	4	4	-	-	4	-	29	20
18	Greenspeed	Jonathan Ricketson	-	4	4	4	-	-	4	-	4	4	4	-	28	21
22	Slingshot	Adrian Brown	-	4	4	4	-	-	4	-	4	4	4	-	28	21
28	Viper	Richard Philpott	-	4	4	-	-	-	10	-	6	-	4	-	28	21
15	C-10	Katina Curtis	-	8	4	-	-	4	-	-	-	4	4	2	26	24
19	20/26	Nick Lake	-	4	4	4	4	-	-	-	-	-	4	-	20	25
21	Linear	Neil Bowman	-	4	4	4	-	-	4	-	-	-	4	-	20	25
31	Greenspeed	Neil McCarthy	-	4	4	-	-	-	4	-	4	-	4	-	20	25
32	Roulandt	Shane McCarthy	-	4	4	-	-	-	4	-	4	-	4	-	20	25
39	Kingcycle	Sherri Prisk	-	-	-	8	-	-	6	-	-	-	5	-	19	29
44	Junior Greenspeed	Laurence Bracewell	-	10	-	-	4	-	-	-	-	-	4	-	18	30
13	Sports Tourer	Ian Sims	-	4	-	4	-	-	-	-	-	4	4	-	16	31
17	C-6	Ben Curtis	-	7	-	-	-	4	-	-	-	-	4	-	15	32
2	Eric	Damien Clarke	-	-	4	-	-	-	4	-	5	-	-	-	13	33
37	SCAV	Greg Rich	-	-	-	-	4	4	-	-	-	-	4	-	12	34
42	Huffy	Holly Bracewell	-	6	-	-	-	-	-	-	-	-	4	-	10	35
42	Huffy	Leanne Fraser	-	4	-	-	-	-	-	-	-	-	-	-	4	36

Points: 1ST Place 10, 2ND Place 9, 3RD Place 8, 4TH Place 7, 5TH Place 6, 6TH Place 5, 7TH Place 5 - all other finishers 4 points.

photograph s prisk

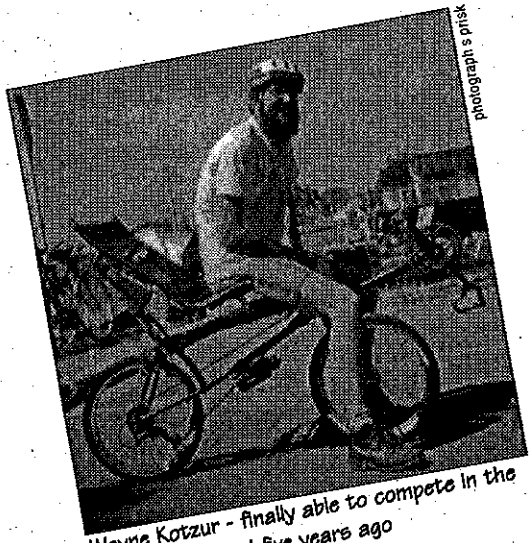
Punctures included at no extra cost. The tandem (left) has just punctured while Geoff Osborne (centre) with two punctures runs to the finish

A front wheel drive and front wheel steering reincarnation of a Raleigh Shopper. Even after two attempts by this vehicle to dissuade Harry from finishing events, he managed an impressive 4th place overall. Harry's riding secret? Several metres of gauze bandage, 3 litres of antiseptic and shredded lycra. A real fashion statement!



photograph m dowling

Hooli Bbrigula built by Harry Gordon, NSW



photograph s prisk

Wayne Kotzur - finally able to compete in the event he started five years ago

A successful collaboration between Karl and Wayne Kotzur. The result is a great all-rounder which competed in all events and came 7th place overall (not bad for a six week old!). Exit is a short wheelbase bike with under seat steering. A large mesh seat made Exit one of the most comfortable vehicles to ride - and with the brilliant purple paintwork, one of the best dressed rides around!

photograph s prisk

Exit, Karl Nissen, ACT

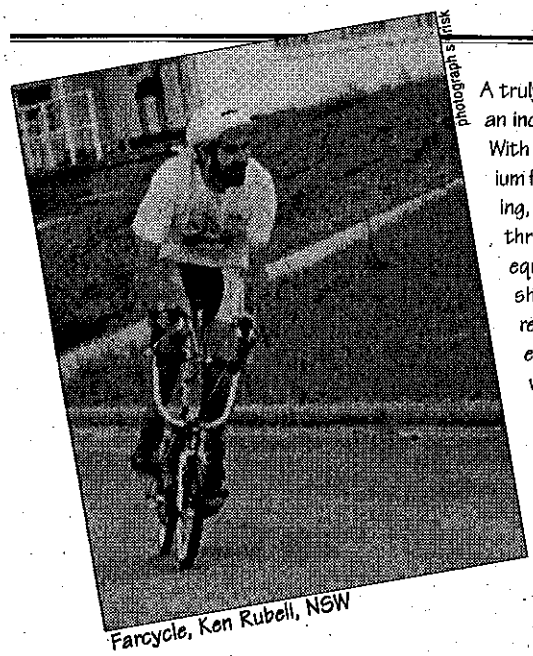
photograph m dowling

Brazen Hussey, Geoff Osborne, ACT

Geoff and his Brazen Hussey returned yet again to the Challenge. Would it be third time lucky in the Criterium? Would he be able to finish without crashing and removing 40% of his skin? We all waited anxiously for the Enduro to finish to see if Geoff was going to attempt the Criterium. Alack, alas, both tyres punctured during the Enduro (hence his cross country bike carrying display), and with no inclination to lose skin again this year, Geoff and his Brazen Hussey did not compete in the Criterium. See you again this year Geoff?

photograph s prisk

Greg Rich attacking the sharp incline in the Shopping Race

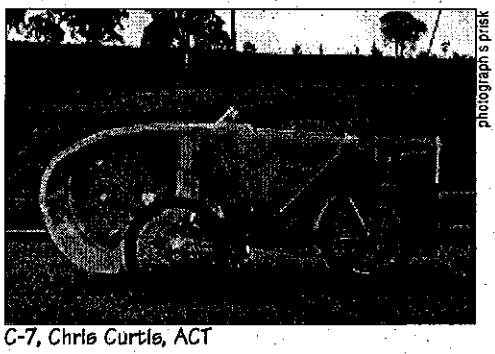

photograph s prisk

Farcycle, Ken Rubell, NSW

A truly astonishing performance by an incredible folding Bickerton bike. With 14" wheels, lightweight aluminium frame and dropped bars for racing, Ken and his Farcycle powered through the weekend to come out equal fourth. At the end of the shopping race after carrying the required load, Ken then proceeded to pack his bike up into the very same shopping bag - proving the Bickerton to be a very practical machine indeed (especially after securing second place in the the Endurol).


photograph s prisk

It's amazing what you can do with an old set of golf clubs!


photograph s prisk

C-7, Chris Curtis, ACT

The C-7 was the only faired vehicle at this year's challenge. The fairing was clear plastic on a light wooden frame and secured with safety-conscious yellow duct tape. As many owner builders know, completion of their vehicle usually takes place on the day of the event or at the required showing to the family "What I have been doing for the last eight months in the back shed". Chris' faired trike along with a junior trike and junior long wheel base bike were all competing in the Challenge, after being built in the last twelve months. Chris has proven that it can be done!

An impressive, semi-recumbent tandem built by Wayne Kotzur. Both captain (upright at the back) and stoker (laid back at the front) get excellent views of the surrounding countryside. Kath uses the Counterpoint primarily for transporting her daughter to school so keep your eyes open for this team in the Adelaide hills.


photograph s prisk

Counterpoint, Kath Cooper & Ken Wilson, SA


photograph s prisk

Junior HPVers line up for the Drag Race


photograph s prisk

Peter Holloway testing his suspension forks during the Enduro

24 Hours on the Go *(or 38 hours without sleep)*

by Sherri Prisk

The longest running recumbent event in Australia is the National Pedal Prix held in South Australia. 1994 saw the ninth running of this event. In that time, it has grown from a small event in a car park to one of the five largest recumbent races and probably the largest 24 hour HPV event in the world. The National Pedal Prix is organised by the Technology Teachers Association SA Inc in conjunction with the Australian Council for Education Through Technology and the Engineering Employer's Association of SA. It has also been the model for similar events in at least three other states.

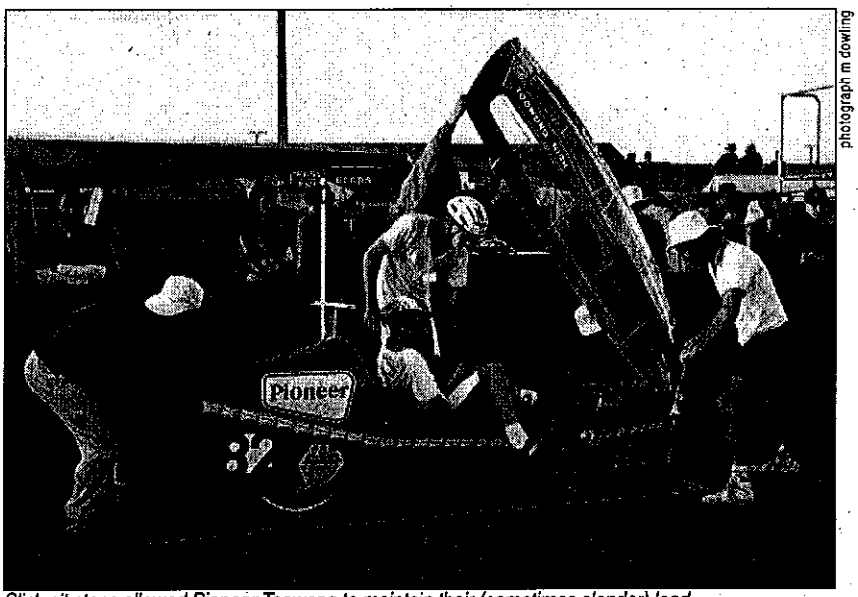
Pedal Prix is no longer run in a car park — the venue is the Adelaide International Raceway. Even so, this venue is only just large enough to accommodate over 80 vehicles and their crews.

Recent Pedal Prix have produced results approaching 800 km for 24 hours. These represent excellent performances because although this is a team event, the majority of teams comprise school students and the race regulations impose a high minimum vehicle weight.

As I had only ever heard about a "24 hour race with over 80 vehicles" I thought it might be an idea to see for myself how one event can attract over 600 riders and yet not be well known in other HPV circles. The following is my account of about 38 hours without sleep ...

Looking around from race head quarters high in the control tower, the car park and camping ground were filling up fast. The pits area, yesterday an empty expanse of concrete and bitumen, was now alive with hundreds of people setting up their areas with all the necessities for a 24 hour event: tool boxes to rival those of Formula 1 racing teams, tarpaulins, exercise bikes, eskies, tables, chairs, beds even heaters! Every conceivable convenience was there in one form or another.

Around 12:45 PM vehicles started to assemble on the grid (and the clouds massed overhead). Everyone was officially welcomed to the 1994 National Pedal Prix and at precisely 1:00 PM Glen Dix, starter for the Adelaide Formula 1 Grand Prix, dropped the green flag and they were off!



photograph m dowling

Slick pit stops allowed Pioneer Toowong to maintain their (sometimes slender) lead

"Some teams had exhausted their supply of spare wheels"

As predicted the first pass though the lap counting area was very congested and vehicles banked up around the back of the speed bowl. Vehicles were funnelled into a single vehicle chicane to allow the automated lap counting system to accurately identify each vehicle. By the end of the first couple of laps vehicles had spread out around the circuit and some form of order reigned.

Using binoculars from the control tower, I could just make out the vehicles as they rounded the final turn nearly a kilometre away (dubbed Siberia) and came onto the main straight. During the race, commentary was provided by Tony Groves, track commentator for the Formula 1 Grand Prix.

Soon after the start a brief rain shower passed. It left behind a strong headwind along the back of the speed bowl - with a welcome tailwind along the main straight.

Even at 6:00 PM there was still over 1,000 crew, parents and cheer squads in the pits. By this stage all vehicles had come in to activate their lights. Most teams had weathered the initial wind and rain shower of the day and were praying for a clear night. Squinting up through the glare of the speed bowl lights, it seemed as though they might be blessed with a fine, though windy, night.

The workshop tents in the centre of the speed bowl were rarely without patrons. The race had taken it's toll on *Wild Thing* from Gleeson Junior Secondary College. A bent frame and steering rods were being re-welded after a small crash. Further along was *Shotgun*, one of Pembroke High School's Junior Secondary entries up on a work stand after being in the CIG welding tent re-working the steering. Their left hand wheel had 'pretzeled' and blown a tyre after a rear end collision with a stationary vehicle.

Dotted throughout the pits were UHF TVs tuned into the local broadcast of race results; clustered around these were people trying to get an idea of how their team was fairing against the competition.

Checking results at 8:45 PM (7 hours 45 minutes into the race) showed *Pioneer* leading both the Senior Secondary and Overall classes on 139 laps (245 km) at an average

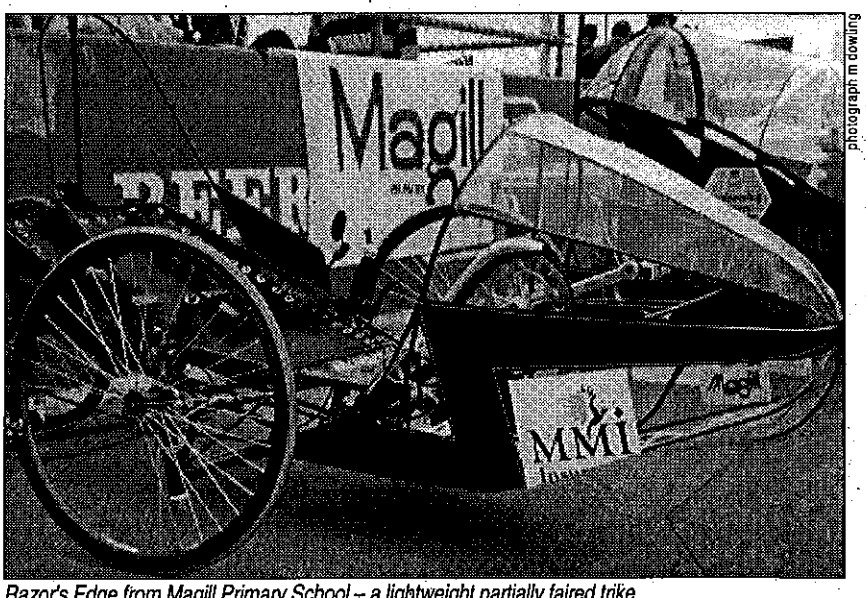
photograph m dowling

Glen Dix on the starting line facing 80 trikes on the main straight of the Adelaide International Raceway

of 31.7 kmh. Close behind and fighting for second place overall was *UZI 3* and *SCU*, both Open class entries and on 135 laps (238 km) each. The leading Junior Secondary team was *Evolution* on 121 laps (213 km) making them 8th overall while the leading Primary team of *Hale Storm III* was on 104 laps (183 km) in 21st place overall.

Around 9:30 PM I passed *Enterprise* from Alexandra Hills High School in Queensland who were in for some repairs. Their left wheel had buckled and the right wheel was not looking too healthy either. I left the crew working frantically to get their vehicle back into the race.

Wheel failure was common. Some teams exhausted their supply of spare wheels (sometimes five or more) before completing the race on the least damaged of their wheels.



photograph m dowling

Razor's Edge from Magill Primary School – a lightweight partially faired trike

Many of the unfaired vehicle riders were starting to rug up against the chill of the night and, at this stage, teams were calling their vehicles in for frequent rider changes to keep them warm and fresh.

Each crew member had a specific job. *Pioneer's* lap counter seemed to be in control of everything from signalling laps remaining, rider changes, and what was needed from the vehicle to the pit crew. He was up all night, stop watch and note pad in hand, keeping a close eye on his four riders, ensuring maximum output from this Queensland team.

It was now 11:00 PM and riders had been going for 10 hours. The temperature had been steadily falling but the wind had dropped, making life a little easier for the riders.

I decided to head up to Siberia, and on my way, called into the RAA scoring caravan to see how everything was going. There was a small group of spectators gathered around watching the vehicles come through the chicane. Each time one passed through a resounding 'BEEP' came from the interrogator. This loud 'BEEP' not only confirmed that the vehicle's card had registered but also stopped the timing crew from falling asleep!

photograph m dowling

Dusk along the main straight

I left the interrogator and the bright lights of the speedbowl and continued the trek up to Siberia. This place is so named because it is dark and isolated. As my eyes became accustomed to the darkness this surreal landscape began to take shape.

Fluorescent green 'landing lights' were set about two metres apart around both the inner and outer edges of the sweeping bend. The white headlights of strange vehicles approached. All I could hear was the whirring of chains, click-click-click of the gears, squeaking of stressed metal and the occasional sound of fairing meeting bitumen. As they rode off towards the main straight, red LEDs flashed erratically into the distance.

There were a few incidents during the night in Siberia — one of the more notable involved *Shotgun* (now back in the race). Their left wheel buckled and snapped off causing an abrupt halt and a few anxious moments as other vehicles tried to avoid it. The SES marshal helped the rider off the track uninjured and radioed for the crew to come and collect their vehicle. Unfortunately *Shotguns's* pit area was at the far eastern end of pit lane and Siberia was at the westernmost point from the pits. This made a long hike for the crew at 11:30 PM.

About 1:00 AM I reached the control tower, in desperate need of a hot coffee and expecting peace and quiet. I was wrong. The urn had boiled dry and the volunteer SES marshals were frantically reporting vehicles for unsafe riding and without proper lights. (There was a section in the rules which imposed time penalties if a team continually disobeyed a track marshall's instructions).

Whilst waiting for the urn water to boil, a call came through that a vehicle had crashed into the interrogator. I think my heart wasn't the only one that stopped. (If the interrogator goes down the race has to be stopped and a manual lap counting system has to be implemented. This did not sound like fun.) Shortly after, a second call identified the vehicle as *Pioneer* (who was leading at that time). Its rider and the interrogator were both operational. An audible sigh of relief swept through the control tower as heart rates returned to normal.

It was getting very cold at 3:30 AM. Looking into the pits there was a large number of faired vehicles coming in. The reason? Fairings have fogged up and the riders can't see! A quick lesson in ventilation saw the crews jump to this new challenge. Several vehicles took off without their fairings (chilly!) to save time, whilst modifications were being made. With countless painstaking hours of work put into these vehicles, the looks on the faces of team mechanics as they cut ventilation holes in their fairing was one of sheer anguish.

Rules & Regulations

Regulations dictate a minimum of three wheels at least 600 mm apart, chain guards, braced roll bars, bumper bars, harness style seat belts, rear vision mirrors and (to complete the 'pseudo-auto' feel) even a steering lock! The last item is not a theft-deterrent, but refers to the stops required to prevent the wheel contacting the frame or rider when turning. Little wonder then that some of the vehicles were uncomfortably close to the maximum weight limit of 55 kg for a single rider HPV.

It is also a condition of entry that each vehicle must pass tough scrutineering as a part of their assessment before being allowed to race. Various stations are set up to check braking, turning circle, lights, mirrors, maximum length and steering. Vehicle weight checks and final registration are completed at Adelaide International Raceway on the Saturday morning of the race.

While all this was happening the heavens opened and icy rain drenched everything and everyone. Suddenly the pits area was a writhing mass of people, tarpaulins and water! You couldn't see the other side of the speedbowl, the rain was so heavy. But as quickly as it came, the rain stopped.

Now faired vehicles were appearing in

photograph p carter

Hale Storm III takes a tumble – note the buckled wheels on this lean steer carbon fibre trike

the pits with not only visibility problems due to fogging, but also saturation problems! Several fully faired vehicles had enclosed their wheels inside the fairings – a good aerodynamic choice. However, with the wheels inside and no mudguards, riders were being blinded and saturated by spray from the water on the track. Some were even being rained on inside as spray collected on the fairing and dripped on the rider. Well, this event is certainly an educational one!

But spare a thought for those unfortunate unfaired vehicles — all they could do was rug up even more and keep pedalling.

At 4:45 AM the familiar bright flash from the CIG welding tent signalled another vehicle being repaired. A call came across the radio from Siberia that *Shotgun* had again crashed (a recurring theme?) this time due to poor visibility. Just over 8 hours to go.

The pits area was really coming alive at 5:30 AM: 11 vehicles were in for rider changes and check ups. There was life in the camping area as race results were excitedly checked by team members, teachers and parents that had been "off duty" for some of the night.

There was a tight race between *UZI 3* and *Pioneer*: both were on 294 laps (518 km) at 6:20 AM averaging 29.89 kmh for the overall lead with *SCU* only two laps behind. One miscalculated rider change or breakdown could cost any of these teams coveted first place. Meanwhile in the Junior Secondary class *Evolution* was on 255 laps (450 km) and the leader of the Primary class was still *Hale Storm III* on 231 laps (407 km).

As the greyness of dawn gradually crept over the circuit, the enormity of this event started to sink in. For the past 17 hours around 1,000 riders and crew have been working non-stop. They have worked as teams throughout the year designing, planning and constructing their vehicles and they have spent many hours testing and training.


photograph p carter

Running repairs at Siberia

"the workshop tents were rarely without patrons"

With the morning progressing, spirits were high even as light drizzle began to fall. The control tower was the centre of race universe. Scores were being calculated, interviews being conducted, official guests were being briefed and final preparations were being made.

At this stage I was invited to wave the chequered flag to finish the event. With some guidance on how to wave a flag (and after nearly gouging out everyone's eyes) I commenced practicing inside the confines of the control tower.

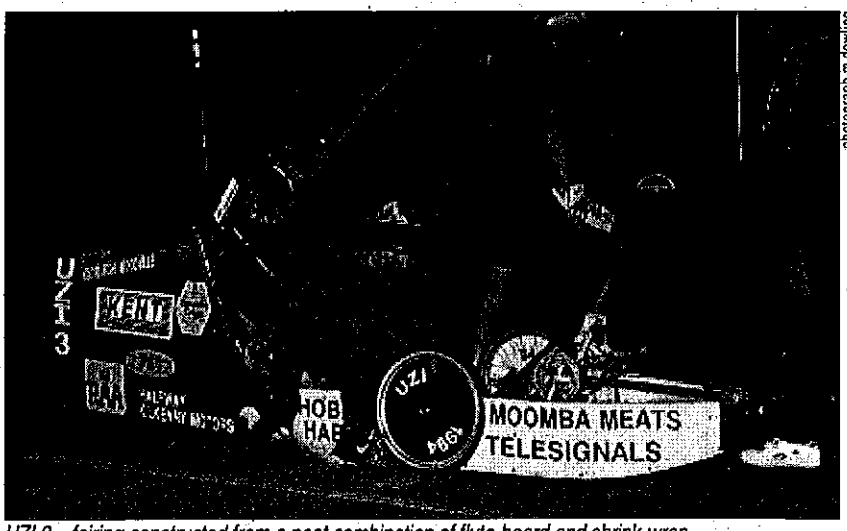
From 12:00 PM onwards the pit area and all vantage points were completely packed with spectators. I was trackside with Graham Cutting awaiting the final approach of the winning vehicle. Standing in the path of around 80 vehicles racing at great speed towards me after 24 hours of racing, I was overcome with a feeling of invincibility.

At this stage my brain indicated that I was just one person with a flag standing on a race track — would I be able to control this bunch? Fortunately, Graham had done this before and brought me back to reality with "Here it comes - Number 82". I stepped further out onto the track as *Pioneer* from Toowong, Queensland crossed the finish line. The crowd went wild and so did I madly cheering all vehicles while waving the chequered flag.

Expressions on the riders faces as they crossed the line ranged from jubilation to relief. *Hale Storm III* from Western Australia was accompanied by the entire team running across the line with their vehicle. Every vehicle was cheered, every team member congratulated.

I enjoyed myself immensely and will be returning to Adelaide for the 1995 National Pedal Prix. This certainly is an event not to be missed.

Turn to the What's On section for details of this year's National Pedal Prix.



photograph m dowling

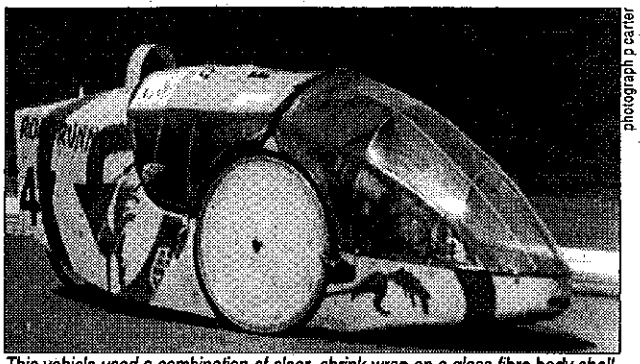
UZI 3 – fairing constructed from a neat combination of flute-board and shrink-wrap

Top of the Class(es)

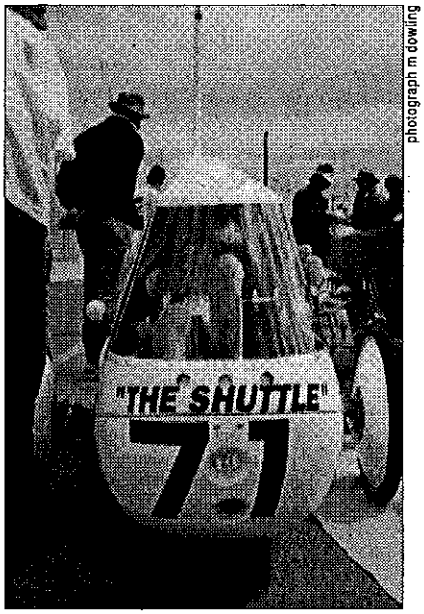
Vehicle	Vehicle Name	Laps	Distance	Class	School
82	Pioneer	410	722.16 km	Senior Secondary	Toowong High School
90	UZI 3	404	711.59 km	Open	Private Entry
96	SCU	397	699.26 km	Open	Private Entry (Standish Cycles)
32	Evolution	361	635.85 km	Junior Secondary	Pembroke High School
63	Mutiny	360	634.09 km	Senior Secondary	Unley High School
93	Clipsal Spirit	354	623.52 km	Open	Private Entry (Gerard Industries)
124	Eudunda Thunder II	350	616.48 km	Commuter	Eudunda Area School
121	Perfect Fit II	345	607.67 km	Commuter	Unely High School
47	Road Runner	345	607.67 km	Junior Secondary	Gleeson College
52	Chill Factor	337	593.58 km	Junior Secondary	Aberfoyle Park High School
83	Vibes	334	588.30 km	Senior Secondary	Pedare Christian School
1	Hale Storm III	316	556.59 km	Primary	Hale Junior School
12	Hahndorf Hornets	314	553.07 km	Primary	St Michaels Lutheran
5	Razor's Edge	310	546.02 km	Primary	Magill Primary School

photograph p carter

Pioneer Toowong crossing the finish line after 24 hours of racing


photograph p carter

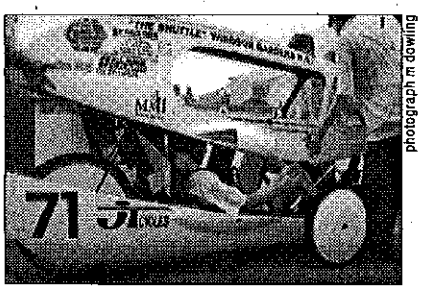
This vehicle used a combination of clear shrink-wrap on a glass fibre body shell



photograph m dowling

Three views of The Shuttle

Glass fibre fairings and partial body-shells are starting to gain popularity. *The Shuttle* was a beautifully crafted vehicle from Windsor Gardens High School. This full featured vehicle incorporated reasonable ventilation, polycarbonate windscreen along with a two-way radio communication system, useful in the blinding rain. Its blunt frontal area hindered an otherwise sound aerodynamic design.



photograph m dowling


photograph m dowling

Lap Scoring

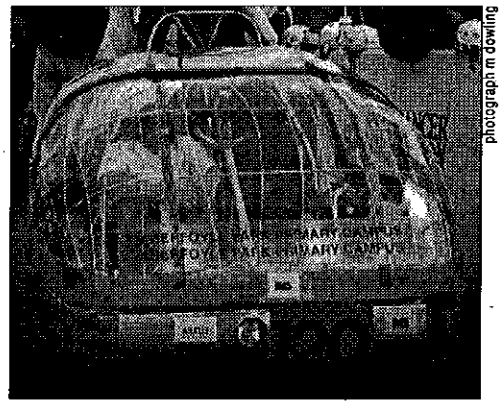
Lap scoring in such a large event could well become a nightmare. Vehicles complete around 18,000 laps in total. This most important task was made painless and possibly even mundane, by an automatic lap counter devised by staff and students from Aberfoyle Park High School in conjunction with local industry.

Using a passive card (about the size of a credit card) mounted to each vehicle on a thin mast and reader or "interrogator" as it is fondly called, each vehicle's laps and lap times are recorded automatically as it passes the interrogator. This information is stored in one of several computers networked to the interrogator. Progressive results were constantly broadcast around the raceway on UHF television sets, with a live picture of the vehicles passing the interrogator, playing in the background.

This scoring technology was also available to each team throughout the event. A bar-coded card was issued to each team which, when swiped at the interrogator, gave the team a full print out of lap times and current results for their vehicle. To avoid any congestion from anxious teams, this information was limited to being printed four times during the event for any one vehicle. So even at 2:30 AM, team managers were busy obtaining the latest results.

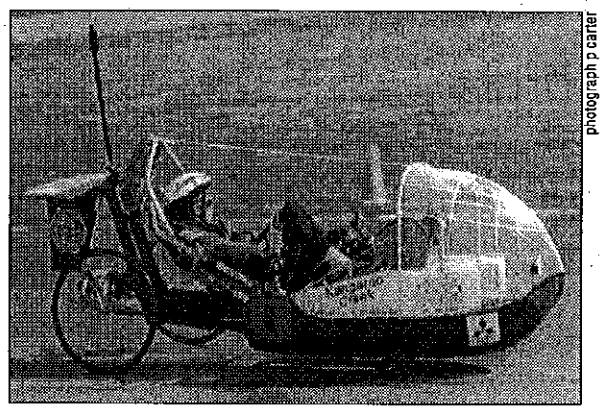
photograph m dowling

Vehicles passing the timing caravan – note their "masts" incorporating the passive card



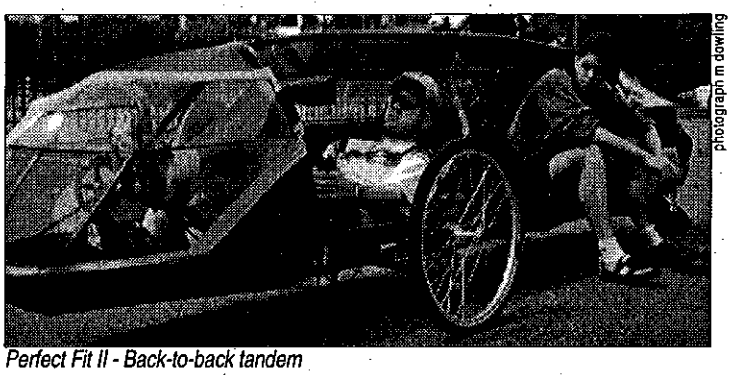
photograph m dowling

This vehicle in the Commuter Class from Aberfoyle Park Primary Campus was the only sociable (side-by-side) this year. It featured a glass fibre base and heat shrink wrap upper canopy.



photograph p carter

Carbon Fibre is making it's mark on vehicles. *Hale Storm III*, a primary school entry from Western Australia, utilised carbon fibre in the frame and front body-shell. It was the only front wheel drive, lean-steering vehicle. During the race, it flipped a couple of times, but crossed the finish line first in its class, minus the front fairing.



photograph m dowling

Perfect Fit II - Back-to-back tandem

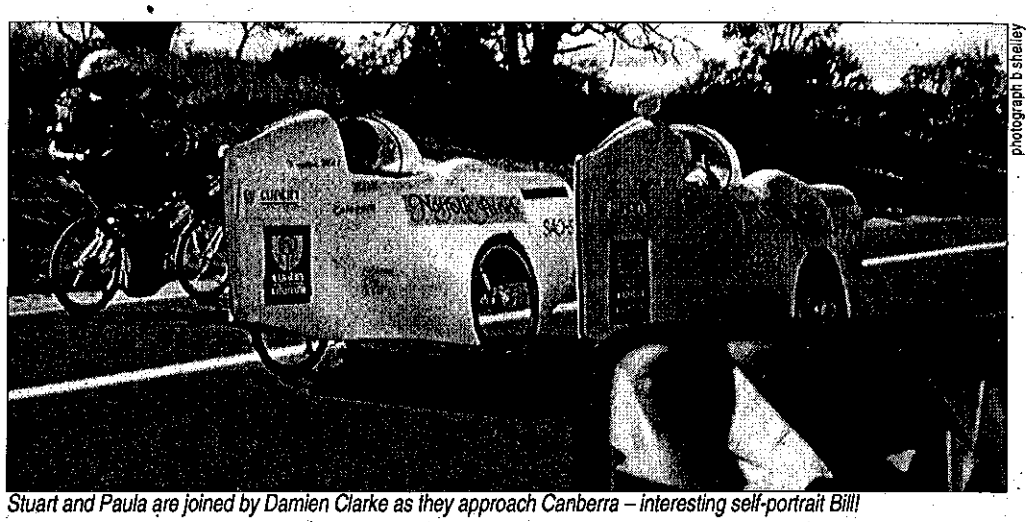
Many of the fairings were constructed using lightweight aluminium tubing and heat shrink-wrap. This shrink-wrap is popular as it is very light, totally transparent, cheap and can be applied with a household hair dryer. It makes a great base for painting and/or applying coloured contact adhesive.

Perfect Fit II (left) was another entrant in the Commuter Class. This back-to-back tandem trike shows extensive use of shrink-wrap in it's fairing. On the roof support, water bottle cages were mounted to optimise space, whilst the captain and stoker both reclined on padded seats.

Norfolk Punch Tour de Nullarbor

by Stuart Andrews

I returned from the "Blind Leading the Blind Expedition" in April of 1993, exhausted from paddling sea kayaks across the Torres Straits from Australia to Papua New Guinea and then walking the gruelling Kokoda Track with two visually impaired athletes. At this stage I hadn't envisaged tackling another arduous adventure for quite some time.



photograph b shelley

Stuart and Paula are joined by Damien Clarke as they approach Canberra – interesting self-portrait Bill!

My girlfriend Paula Matthews and I had been heavily involved in competitive sport for a number of years and we both missed those physical challenges that had for so long played such an important part in our day to day existence. To some extent we gained a great deal of satisfaction from sharing our knowledge and expertise as personal trainers. However we still wanted to experience those physical and mental challenges that put a little adventure in our lives, which is something we all need. The planning of a future trip dictated the need to trial a number of nutritional and physiological tests.

Since Paula was living in Perth at the time, she suggested that we ride from Perth to Canberra because she had to finish her university degree in Canberra. I remember thinking to myself this is going to extraordinary lengths to save on an airfare. We busily chased sponsors and planned the trip to leave Perth on Friday 1 July, arriving in Canberra on Sunday 24 July. We chose to do the trip in 24 days was because that was the length of mid-semester break before Paula had to recommence studying again.

While I worked on getting the two recumbent trikes designed and built with local frame builder Wayne Kotzur and fairing designer Bill Shelley, Paula was busily organising the route we were to take. A telephone call late one night found me listening to Paula's excited voice on the other end of the line, "How does the Tour de Nullarbor sound?". It is this sort of excitement that makes anything possible and we finally had a name for our trip.

photograph m dowling

No, Stuart isn't being attacked by his trike – just attaching his fairing

I had read an article some years ago about how a French civilian on a recumbent bike challenged and beat the reigning world cycling champion on a velodrome. He went on to break the world hour record of the time. This resulted in recumbent bikes being banned from cycling competitions as they were deemed not to be proper bikes. To cut a long story short I became obsessed by recumbents and how they were so much more efficient and comfortable than upright bikes. Because the rider is seated in a reclining position he doesn't suffer from sore wrists, back and neck pain as experienced on normal bikes. The lower centre of gravity makes them up to 30% more efficient to pedal and this is increased even further by addition of an aerodynamic fairing which also offers much needed protection against the elements (an important consideration when riding in Canberra during the winter).

We both wanted to promote fitness and health and consequently we approached appropriate sponsors. We found our major sponsor in Norfolk Punch who make a non-alcoholic health drink from a 500 year old recipe that has recently been rediscovered in England. So the Norfolk


photograph b shelley

"Whaddya mean straight on? I'm sure we turn left here!"

Punch Tour de Nullarbor was born involving pedalling two recumbent trikes from Perth to Canberra in 24 days covering a distance of 5,260 km.

During the final stages of our preparation, an opportunity presented itself whereas Paula and I were placed in a position, not only to promote health and fitness, but also to raise funds for the "Make a Wish Foundation" which helps grant terminally ill children their dreams and wishes.

On the morning of Friday July 1 we found ourselves sitting in our trikes in front of The Surf Club Cafe in Fremantle watching camera crews and spectators huddled together under the awnings trying to escape gale force winds and rain. This isn't exactly what we had envisaged. We made our way out of the car park following our two police escorts. The first hour was nothing short of a nightmare as we battled against the winds which, on a number of occasions literally blew us off the road. Later that afternoon I was hit by a sudden gust of wind which picked my trike up onto two wheels. I came crashing down on the other side of the road. We decided to remove the fairings until the wind dropped.

The first couple of days were hell; the hills, rain and wind were not exactly the kind of introduction we had expected. When we were coming into the small Western Australian town of Nannup, Paula and I screamed down a hill, raced through the middle of this town only to pull up in front of a crowd of locals. At first they stood and stared with amazement not quite knowing what these small space-age craft were. I had only just climbed from the trike when one of my tyres exploded. I nearly jumped into the arms of the lady beside me and the locals couldn't stop laughing.

"this is going to extraordinary lengths to save an airfare"

After settling down, we grabbed our fund raising tins from the support van and decided to visit the local pub. To our amazement we raised a couple of hundred dollars in a matter of minutes. As we were to learn the generosity of people we came across was, at times, overwhelming.

One of our many experiences included sleeping in some old shearing quarters at the top of the Fraser Range just prior to crossing the Nullarbor. We were all amazed at just how clear the sky was, for the whole of the night sky was totally ablaze with stars.

One problem we hadn't considered was the fact that the Nullarbor is treeless. This proved especially difficult for Paula when she needed to go to the toilet. I can remember Paula pushing her trike out into the middle of this flat plain and squatting down behind it. The wind however, kept blowing her trike ahead of her ... (the rest I will leave to your imagination).

The numerous radio and television interviews soon spread the word about what we were doing and it wasn't too long before cars, trucks and even helicopters were pulling up to make donations.

Paula and I attended a fund raising dinner in Melbourne to raise money for a hospital for terminally ill children where $17,000 was raised in one night. We are still awaiting the final figure of the total amount we raised.

Our support crew was supposed to document our eating habits on the trip, but after a while, the initials RFF (Random Feeding Frenzy) appeared in our journals. When crossing the Nullarbor, most people would see shimmering watery mirages — I'd see cream buns. Food often became our motivation to get to the next town.

For me one of the most memorable moments was reaching 46 kmh and maintaining this speed for up to two hours at a time. This shows you just how efficient the recumbents are, especially in light of the fact that this took place during a 200 km ride.

One thing I would like to mention is that before we started on the trip I was worried that we didn't have enough spare parts with us incase anything broke down on the trikes. This proved not to be a problem as the Sachs equipment worked flawlessly, even when it should have broken down it just kept on running like a dream. If this sounds like a plug for a sponsor it is because we absolutely thrashed this equipment and it deserves all the recognition we can give it. It's a nice feeling to know that when you have a tight schedule to keep you don't have to worry about your vehicles. On that note I'd like to thank Wayne Kotzur for the beautiful job he did in building the two trikes and Bill Shelley for his wonderful design work and creative construction methods in building the fairings.

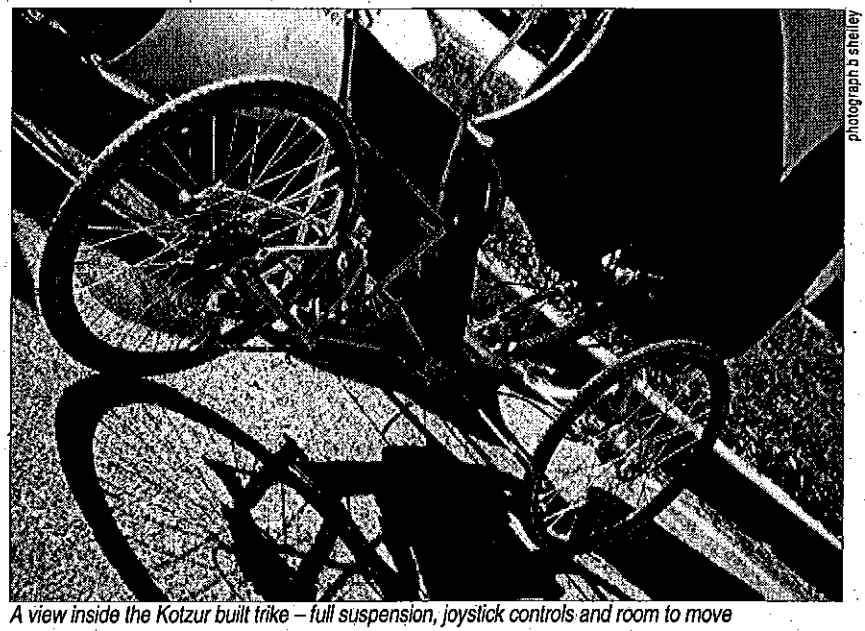
Finally we would like to thank all those people who turned up to escort us through the numerous towns and cities while we made our way across Australia - it was great having your support.

The Tour Postscript

by Stuart Andrews

People often ask Paula and me why we chose to do the trip on recumbent trikes rather than recumbent bikes. The answer to this is primarily because I was originally fascinated by the trike concept and their stability was an appealing factor when covering such long distances as we were. There was the added bonus that the fairing supplied an ample amount of space to display our sponsors.

However, if I had the opportunity to do the trip again I would definitely do it on a recumbent bike. There are many reasons for this, some of which aren't apparent until you do a trip such as ours. The main reason is to do with the fact that the trikes are too big and take up too much space on the road. This is a problem if you are not moving as fast as the surrounding traffic. Even though you may be more visible, you still tend to create problems rather than alleviate them.

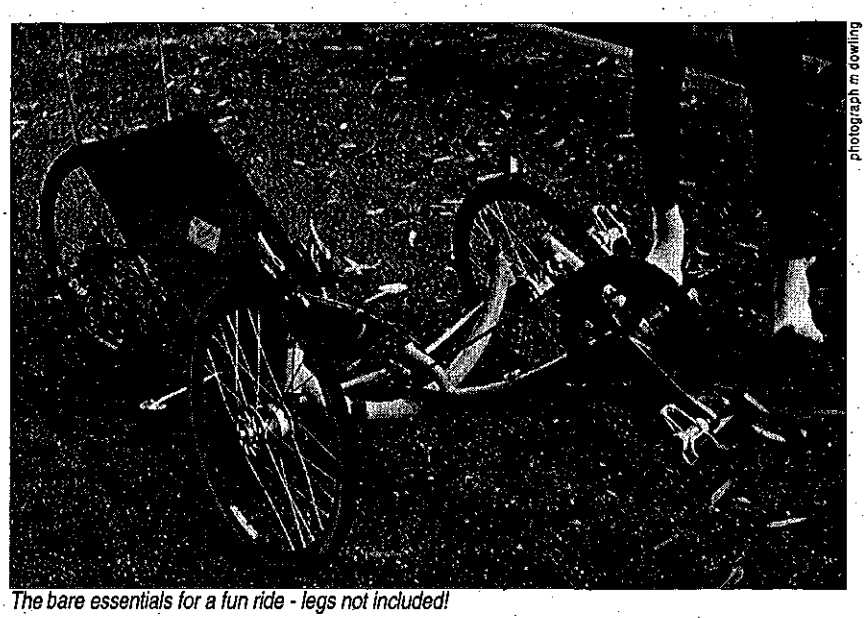


photograph b shelley

A view inside the Kotzur built trike – full suspension, joystick controls and room to move

Because of the trike's configuration of two front wheels and one rear it makes it extremely difficult to miss potholes for invariably one of the wheels hits the pothole — I'm glad we had suspension. On a number of occasions when we tried to miss potholes we risked either going off the road and puncturing tyres on the rough edges or swerving the other way and getting run over by an oncoming vehicle. A not so obvious problem was brought to our attention by the fact that our necks were getting sore from the constant slope of the road. The support crew noticed that both our heads would be tilting to one side due to road slope. On a recumbent bike this would not happen.

"they are great fun machines to ride"



photograph m dowling

The bare essentials for a fun ride - legs not included!

Another noticeable disadvantage with the trikes is that they are bloody awkward to get in and out of motel rooms! It is also difficult to find somewhere to put your trike when you go shopping because they get in the way of pedestrians in public places. This then gives rise to the disadvantage that when you don't put them in a reasonably visible place they become a security risk — they always attract attention, some of which is unwanted.

Since arriving back in Canberra we have also experienced problems on bike paths with the trikes being too wide. This is especially the case with the dividing rails that lead on and off the bike paths to the roads. Both Paula and myself see trikes as a great way to have some fun but personally wouldn't recommend them as commuting vehicles because you are putting yourself and the drivers around you at risk.

I am currently building a two wheeled recumbent to overcome the problems I have listed, but I will always have a soft spot in my heart for trikes, for they are great fun machines to ride.

Paula's trike is for sale. It is in Canberra while she is back in Perth. If you are interested, please write to Paula Matthews directly at 20 Hilltop Rise, Willetton WA 6155.

What's On

4 - 7 August 1995
CycleFest 1995
Lancaster, United Kingdom

CycleFest is a four day festival of cycling – both a celebration and a meeting place for people and ideas. It is based around the campus of the University College of St Martin, Lancaster.
Feature events include:

- Open racing on Lancaster's purpose built 1.5 km circuit. Classes include HPVs, classic lightweights, veterans, Moultons, Pedersons and others.
- Trade Show with a chance to test ride different machines
- Guided Local Tours
- Cycle-Art Exhibition
- Practical Trials
- Unicycle Hockey and much more.

Contact:
Peter Cox
32 St Georges Quay
Lancaster LA1 1RD
UNITED KINGDOM
Phone: +44 1524 849 083

11 - 13 August 1995
1ST Bergisch Gladbacher HPV Champs
Bergisch Gladbach (near Cologne), Germany

A weekend of road racing including a 14% Hill Climb! All only 200 kilometres from the World Championships.

Contact:
Axel Sarnoch
Mutzer Strasse 80
Bergisch Gladbach
GERMANY
Phone: +49 22 02 79 912

12 - 13 August 1995
British Human Power Championships
Leicester, United Kingdom

A weekend of fun and frivolity at the big annual get-together of the British Human Power Club. There may even be racing!

Contact:
British Human Power Club
22 Oakfield Road
Bourne End, Bucks LS8 5QR
UNITED KINGDOM
Phone: +44 1628 528 775

19 - 27 August 1995
World HPV Championships
Lelystad, The Netherlands

For the best HPV racing in the world come to Lelystad in The Netherlands for the first World HPV Championships. Register your interest with the AHPVA *NOW!*
Human Powered Boats will contest six events over two days. Then the fastest vehicles on land will take to the scenes with nine events from 21 - 27 August.
A World HPV Information Day and Symposium is planned for Friday August 25. Join the crowds riding from the German and British races.

Contact:
Murray Dowling
PO Box 5035
MORDIALLOC VIC 3195
Phone: (03) 9682 0244 (Until late July 1995)
or the organisers on Phone/Fax +31 2153 16214

9 - 10 September 1995
Paris-Amsterdam Non-Stop
France to The Netherlands

Starting at 6:00 PM in Paris, riders will head off into the French night. Crossing France, Belgium and The Netherlands this is a truly international event. There will be aid stations approximately 50 km apart along the route and all kinds of HPVs are allowed.
Last year's winner was Dutchman Derk Thijs riding his revolutionary 'rowing' bike. He completed the 540 km course in 18½ hours.

Contact:
Email: softwear@simplex.nl
or phone/fax/email
Murray Dowling for more info

15 - 17 September 1995
North American HPV Speed Champs
Michigan, USA

A three day get-together with technical discussions on Friday followed by two days of HPV racing.

Contact:
Great Lakes HPV Race Series
Don Barry
Phone: +1 317 831 8798

More Events! We want More Events!

30 September - 1 October 1995
National Pedal Prix
Adelaide International Raceway

Watch Adelaide come alive for a 24 hour event with a difference. Over 1,000 riders and crew will compete this year in the tenth National Pedal Prix. It's the hottest contest for environmentally sustainable transport technology held in Australia. There are classes for primary students through to senior secondary and a truly open class if you are willing and able to go the distance!

Contact:
John Bussenschutt
Scotch College
Carruth Road
MITCHAM SA 5064
Phone: (08) 272 7511
Fax: (08) 271 7916

11 - 12 November 1995
HPV Challenge
Canberra, ACT

Once again the annual HPV Challenge is being organised by Pedal Power ACT. To be held at the Sutton Driver Training Course just outside of Queanbeyan, this weekend of friendly competition is for all HPV enthusiasts.
Events include: sprints; slalom; road race; time trial; criteriums and more.
Come along for a great social weekend.

Contact:
Wayne Kotzur
7 French Street
HACKETT ACT 2602
Phone: (06) 241 7966

24 - 26 November 1995
Energy Breakthrough
Maryborough, VIC

The 1995 Energy Breakthrough is designed to provide opportunities for students, teachers and the local community to come together in a weekend of technology and innovation culminating in the 24-hour Energy Breakthrough.

Contact:
Maryborough District Promotions
PO Box 194
MARYBOROUGH VIC 3465
Phone: (054) 604 511

WORLD
HUMAN POWERED VEHICLE
CHAMPIONSHIPS 1995

Lelystad, The Netherlands

Lelystad is a town in the middle of Holland, The Netherlands. By air you normally arrive at Schiphol Airport, Amsterdam. There is a direct train from Schiphol and Amsterdam Central Station to Lelystad Central Station. This trip takes around an hour. When you arrive in Lelystad by bike, train or car, it is best if you go to the HPV Information Office (see below) first. This office is 5 km southwest from Lelystad Central Station, where if necessary, you can rent an ordinary bike.

The information office in Lelystad will be next to the camping ground 'T Oppertje. It will be open from Friday 18 until Sunday 27 August 1995, normally the whole day and the early evening. Registration will be done there, and information of all kinds will be available. When a race is going on, the office will not be open, but on the door/window will be a notice detailing where we are. The address of the camping and information office is:

'T Oppertje, Uilenweg 9, Lelystad, The Netherlands

Accommodation: Camping

We would like the participants to camp or stay at 'T Oppertje near the Information Office. Dogs are not allowed. Caravans and campers are allowed. There are a couple of cabins and caravans for rent there too. You can also swim and surf. Costs for 2 people and one tent is: **f17.50 per night** *(plus f1.00 each for a shower)*. To rent one of the cabins or caravans please contact the owners direct:

The Camping Manager
'T Oppertje

Phone: +31 3200 53693 Fax: +31 3200 50873

When the camping ground is full, you may have to go to another camping ground in the centre of Lelystad which is called De Houtrib – the contact details and owner are the same.

Accommodation: Other

Youth hostel 'De Oostvaarder'
Oostvaarderdijk 29, Lelystad

Phone: +31 3200-60072

Near the train station is Hotel Lelystad. Costs are as follows:
Single HPVer *f*137.50 Two HPVers *f*160.00 **per night**

Phone: +31 3200 42444 Fax: +31 3200 27569

Registration

Participants from abroad do not have to pay in advance. If you wish to participate, please contact the AHPVA who will forward the information to us. It is important that we have an estimate of the number of participants to improve planning. The registration fee is about 100 Dutch Guilders (*f*100) which you can pay in cash when you arrive at the registration office.

Waterbike Races

19 to 20 August 1995

The Human Powered Boat races will show the variety available for competition, transportation and recreation. Not every boat will reach the speed of the "flying hydrofoil" (world record of 34.25 kmh) but they all show the skills and inventive spirit of their builders.

- 110 m Sprint
- Slalom
- Long Distance Race
- Bollard Pull (Measurement of towing force)
- Drag Race (Acceleration, knockout system)
- Special Trial

Land HPV Races

21 to 27 August 1995

The races for Human Powered Land Vehicles will be held at different locations throughout Lelystad. There will be several races. Some races will test high speed only, and some will test other aspects like manoeuvrability and acceleration.

The land contest will include the following events:

21 August	200 m Sprint (1,400 m runup)
22 August	Time Trials - 1 mile, 4/5 km, 10/20 km
23 August	Rally for Commuter & Practical HPVs 100 m Standing Start Race
24 August	45 Minute Criterium: heats & semi-finals
25 August	Criterium Finals World HPV Information Day IHPVA Board & Members' Meetings
26 August	1 Hour & 6 Hour Time Trials
27 August	Devil-Takes-Hindmost Criterium where the last one across the line in each lap has to pull out.

Costs are correct as at 26 May 1995. An Australian Dollar buys approximately f1.11 Dutch Guilders. Please check with your local bank for current exchange rates.