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From The Editors – George Durbridge and Stephen Nurse

Welcome to August. There are several OzHpv and international recumbent events coming and these are listed in the back of Huff. The OzHpv committee and organisers have been based in Canberra and Melbourne for several years and we can only arrange events within a short distance from our bases. That doesn't mean our members can't organise an event closer to their homes with OzHpv's help! Recently OzHpv assisted with Tim Corbett's 6 hour trike record attempt. We have developed an application to help you to organise an event and we invite you to use it! (Generally hire of cycling tracks requires an insurance certificate which we can provide). Hiring tracks for "open" cycling competition is central to OzHpv's aims "to promote HPV's as a way to travel and as a way of reducing polluting motorised transport". For assistance email secretary@ozhvp.org.au

The Mavericks

The Human Powered Vehicle community has always relied on mavericks to try new things, to make bikes and trikes go faster even when it doesn't necessarily makes sense. So here are some recent examples, look forward to seeing how they go.

The World rowing bike Championships will be held in Holland mid-September. The website for the event thoughtfully provides downloadable photos, see <http://rowingbike.com/site/EN/EC-Rowingbike/European-Championships> . If a Plain old rowing bike or back to back tandem is not enough for you, try a back to back rowing bike. This photo shows Alert Jacobs and John Poot in the 2008 event.



This year's Battle Mountain World Speed Challenge will include entrants from Australia's Trisled, Varna / Sam Whittingham, Delft University and Graeme O'bree. And it's Graeme O'bree who gets all the attention. He is well known for breaking the Hour record for uprights on unconventional machines and will try out at Battle mountain on a "prone bike", head first, face down. New photos and video pop up on the internet every now and then but we've yet to see Graeme's bike with a fairing. And he'll need it! The Delft University, Trisled and Varna trikes are all very slick with the Delft team looking particularly strong. Battle Mountain 2012 takes place from September 10th to 15th

Here we have a triumph of style over substance. Mohsen Saleh has posted pictures of this bike on his website. Exciting because it combines the never quite made-it technologies of rear wheel steering and through-the hub front wheel drive. There is also a video of how the bike was made. There are some great concepts there including rear wheel steering discussions and the planetary gearbox looks interesting and promising and there is even a photo of a young lady with the bike and the caption “sexy bicycle for sexy ladies”. The web page drops the clanger right at the end: Known Issues with current prototype: “Despite my efforts to build a high quality prototype, The prototype is too wobbly to be ridden”. Ditch the rear wheel steering and keep trying, Mohsen!



The last Velovision includes a mention of a “Patterson Transmission” in an article about a Terra – Trike Quad bike. Following up led to the website for the product.

Sam Patterson is responsible for inventing grip shifters. He has worked at Sram as a lead inventor and has now founded [Patterson Transmissions](#). Their main product is an epicyclic- gear bike transmission. The drive is a competitor for the Schlumpf speed drive and is a crankset which provides a 1.6 times overdrive on a 28t front crank giving a 45t equivalent high gear. The drives seem quite economical at \$299 plus freight. By way of contrast, Schlumpf drives can cost \$1000 or more.

Schlumpf and Patterson drives are marketed as suitable for all sorts of bikes but there are other versions out there like the [Hammerschmidt](#) from Sram marketed more for mountain bikes.



The [Proceedings of the Australian Transport Research Forum](#) from last year provides several papers related to the construction of velomobiles and these are "[PUUNK my ride: development of the Personalised User generated Upcycled N-configurable Kit velomobile.](#)" by Mark Richardson and "[Designing Vehicles for Natural Production: Growing a Velomobile from Bamboo](#)" by Alexander Vittouris.

If you have some spare time, they are worth a read but be prepared to be slightly annoyed by them! The abstract of Richardson's article reads “while velomobiles are a comfortable commuter cycling alternative, their current lack of widespread usage is due to negative socio-cultural perceptions of this type of transportation and the lack of a diverse range of ‘Cool’ velomobile products..... The paper goes on to outline the development of the PUUNK (Personalised, User generated, Upcycled, N-configurable Kit) system as a framework for an open-source, reconfigurable, low cost velomobile.” I'm not sure if the “kit” type velomobiles in the article have been built or are elaborate cad models.

Alexander Vittouris made a velomobile by specifically training Bamboo to grow in the shape of a frame. The result is a (not particularly practical) vehicle which features a particularly low carbon footprint during construction. Having seen the prototype in a brief article in the papers several months ago, it's interesting to see some in-depth material about his concepts. Whatever shortcomings it has, a prototype exists in the metal.... er in the wood. You know what I mean.



The world Human Powered Vehicle Championships were held near Deal in Kent in June. The event was held in spirit of friendly competition and there are several interesting accounts of the events including those on the [WHPVA](#) and [Ice Trikes](#) websites. The Ice Trikes site includes details of Tim Parker's win as the junior champion and technical details about making corflute fairing plans from 3d cad models.

With drugs in the highest levels of conventional cycling much in the news, I can't help but be glad I'm involved in the HPV scene, where even the World Championships are accessible to anyone who can get there. We'll never make any money but get to compete with friends in a very "clean" and enjoyable sport, until our dotage if we choose!

What did you say you ride? *By Rebecca Edwards*

"Umm hello? Are you ok?"

Your mouth is open..., I think I just saw a moth fly into it.

Are you having a stroke? Are you sure you're ok?"

Look, all I did was ask for a replacement pedal for my recumbent."

Hand up if you've had this experience in a bike shop before..., ok put your hands down, the underarm smell is getting to me. Obviously you've all been out riding your recumbents. Alas I can't join you in that endeavour at this point in time, because my bike is off the road, and 3,500km away from my current abode. It's a long story, but not the story for today.

What I'm talking about is the lack of knowledge bike shop staff have of recumbents. It's like we have asked for the secret of the universe because we are visitors from another planet, even though the part we need is a common to most bikes part. How is it an industry can survive, when something as simple as a different seating position can turn someone from an expert into a bubbling mass of inert goo?

I ask this because I'm currently restoring a 1978 light commercial truck, which for the most part, shares various components with other vehicles from the same maker. For want of a better name, let's call them ATOYOT, so as to avoid any copyright issues.

When looking for parts, I can call a parts place, say the vehicle make and model, and they say "Yep, that's this common car part, we have it", or "That's part of the truck part, this place has it." So why can't it be the same with bike shops?

Why is it, that unless something has a diamond frame, all the parts suddenly become unknown? Now I'll admit I'm no bike mechanic, but to the look of it, apart from the frame shape, the seat, and in some cases the brake system, all the other parts are pretty much the same. A 6 speed *dérailleur* is a 6 speed *dérailleur* (unless they changed the name and I missed that meeting because I was too busy watching cat videos on the internet), a tyre is a tyre, a bell and a whistle are what they are.

So I've given up. No longer will I spend my time trying to explain that a recumbent is a bicycle. No longer will I put up with the snorted laughs of these bike shop people because they think that a recumbent is only for people with an IQ below 3, who still live with their parents despite being in their 40's. No longer will I put my hand in my pocket, hand over money for any item at all in their store.

No instead I'm going to be loyal to those who do know that there is more to bikes than a choice of on road or off road, adult or child, green or purple. Because let's face it, those who do know what a recumbent is, really are the experts when it comes to bikes, and should be rewarded as such.

Don't Blame the Ban! (Stephen Nurse with *comments from George Durbridge*)

There are several factors commonly given as reasons why recumbent cycles were not developed and sold in significant numbers until the 1990's are

- * Engineers and tinkerers who developed bicycles in the 1890's went on to develop cars, planes and motorbikes in the early 20th Century and moved away from human powered cycle design.
- * Competition and publicity for recumbents was stymied from 1934 (when the UCI banned recumbents from racing and record breaking) until the first International Human Powered Human Powered Vehicle Championship in 1974.

These reasons are valid, but it seems that there are other reasons explaining the slow uptake of recumbents. Don't blame the ban!

The late 1800's was a period which saw great innovation in cycle designs. The bicycles commonly available changed from high and dangerous 1880 Penny Farthing machines which were mostly ridden by daring men to the 1895 low safety bicycle which could be ridden by men and women alike. The 1890's safety bicycle was so revolutionary that it caused changes in the layout of cities, in fashion, in roads, roadsigns, maps, and hotels. Its development led to the development of motorbikes, cars and planes. It had its limitations which were due to the technology of the day but its greatness overcame these limitations.

The bicycle of the mid 1890's had but one gear and were ridden on rough roads. But the safety bike had an ace or two up its sleeve.

- * It was one of the fastest vehicles on the road at the time.
- * The educated cyclist or salesperson could choose the most appropriate gear for a particular rider or terrain.
- * Ladies cycles which had a low step over height were available.
- * When ridden up a short hill, the rider can stand up off the seat on the pedals and get over the hill in a higher than optimum gear with a short burst of pedalling. When not laden with luggage, the excellent structure of the safety bike allows the bike to have a light weight, and give the bike and rider every chance of getting over hills. (Recumbents can cope with this in a different way, see later)
- * When laden and if confronted by a larger hill, the safety bike is easy to push up hills when the rider dismounts.
- * Leather or sprung saddles, pneumatic tyres and large wheels on the 1890's bicycles meant they handled rough roads with some aplomb. If roads got too rough, riders could (again) stand up on the pedals and use their legs as springs.
- * Lastly, when riding faster or into headwinds, the experienced rider could duck low on the handlebars and avoid some of the worst effects of wind resistance.

So, by 1895, although the diamond frame bicycle was not perfect it was good enough for many purposes

The recumbent bicycle could not have flourished in the 1890's. The recumbent can be

- * Awkward to push up hills and impossible to ride standing up on the pedals necessitating low gears (see later for comments)
- * Fast downhill and on the flat necessitating high gears and good brakes
- * Impossible to ride standing up on the pedals for "inbuilt" suspension necessitating good layout or suspension for a smooth ride on poor roads.
- * Inherently heavier and less structural than safety bikes, necessitating lightweight materials and parts if a reasonable weight is to be maintained.
- * Difficult to ride without clip-on pedals

In fact, the inventions and materials which make recumbents possible and competitive with standard bikes on open roads were not common until the 1970's or 1980's. These include aluminium cycle rims, inexpensive wide range gearing, reliable light weight tubing, V-brakes, handlebar mounted

gear shifters and clip-on pedals. The parts were developed for the new style bikes of the time, the mass produced ten-speed racers and mountain bikes.

With all these inventions the recumbent, (which was always aerodynamic and relatively comfortable compared to the safety bike) could also become safe, lightweight, brake well, and be pedalled up and down hills.

Other important ingredients in the "soup" that led to the sustained selling and marketing of recumbents in the 1990's were

- * The competition and camaraderie of Human Powered Vehicle Associations across the world, and
- * The environmental responsibility felt by many following the oil shocks of the 1970's.
- * Improved roads where great suspension was not needed
- * Safety bikes had become cheap and subject to fashion, and people wishing to experiment with building recumbents didn't need to look much further than hard rubbish collections for steel frame cycles as raw materials.

Once reliable and versatile recumbents could be bought (the first Encyclopedia from 1993 features 8 recumbents including 2 trikes, a tandem and a rowbike) the makers generally met with success and the number of suppliers increased. But the uptake was nothing like the uptake and displacing effect of the first Diamond frame safety bikes in the 1890's. First of all, inexpensive and widely accepted safety bikes were already available as were cheap cars and motorbikes as transport. Secondly, despite some competitions and publicity, recumbents were not generally well known or talked about.

Commercial manufacture of recumbents is now mature with many cycles made by low cost / good quality firms in Taiwan and China. Good quality machines are sold for \$1- 2,000 new and for even less than that secondhand. Lots of people and inventions to thank for that, but the cycle innovations of the 1970's and 1980's are at least partly responsible.

George Your comments please!

Steve,

Thanks for sending this. There are some good points here, and it's much better than conspiracy theories, but there's a lot I don't agree with. It reads better as an answer to why the low-racer did not take off in the 1890s, rather than why LWB recumbents broadly like the Mochet machines did not take off. But nobody seems to have been thinking about low-racers at that time, although there were a very few designs for LWBrecumbents in the 1890s.

Every advantage the diamond frame bike derives from materials and components, it shares with the recumbent, as the same suppliers are generally available to all, as are most of the economies of scale. So drawn steel tubes, sprung saddles, Dunlop tyres, early gears, working brakes and light spoked wheels of any size were available to Mochet, his predecessors and anyone else who wanted to build a recumbent over that period. In particular, penny-farthings were already made with lightweight tapered drawn steel tube.

That mostly leaves brakes, gears, cleats, seating position and machine weight. With similar brakes, a recumbent stops as well as, or better than, a diamond frame, because the weight is lower in relation to the front wheel. V-brakes would have been nice to have, for all bikes, but the recumbent was no worse off with the brakes of the day than was the diamond frame. Getting off and walking up hills is actually easier with an LWB than with a diamond frame, because it's easier to get your feet to the ground and the top tube is lower. You don't need cleats on an LWB, any more than you do with a diamond frame: they may be nice to have, but they aren't essential, the way they are with a high bottom bracket. Both of these points from extensive personal experience with the Tortoise bike (Tartaruga Bike).

Gears - both the Sturmey-Archer gearbox and the first derailleurs go back to the Edwardian period. Even before that, people were using adjustable gearing, such as reversible rear wheels with different sprockets on the two sides. Austin Freeman, in a story written before WW1, mentions a cyclist in a hurry selecting the high gear before starting, treating it as something that didn't need explaining.

Seating position - the recumbent rider doesn't need to stand on the pedals for power, as he can push on the back of the seat. (Yes, recumbents are slower up hills, but this isn't the reason why,

unless standing on the pedals turns you into a perpetual motion machine.) He can't use his knees as suspension (much) but the recumbent is generally more comfortable than a diamond frame, anyway.

Air resistance is generally on the side of the recumbent. It probably wasn't a huge factor with single-speed bikes anyway, except for very athletic riders. At a cadence of 100rpm, a seriously big penny farthing might do 15 or even 18mph, and a single-speed Rover with 72-inch gearing 22mph.

There is something in the weight argument, but not a lot. Mochet made fast bikes, reasonably light for the time, using the same sort of tubing and brazing as had been available and used in diamond frames since the nineteenth century, and more advanced structures than are usually used on recumbents today: reasonably deep, partly triangulated twin-tube frames, with each member lightly loaded and lightweight. Interestingly, I don't recall Arnfried Schmitz (who would have known) suggesting that those frames were weak or flexible.

The most interesting thought of all is that the car drew off the talent. Obviously, some individuals and companies such as Humber made that transition, and it is striking that Sharp's book was not superseded for about 80 years, if it has been. And we know that aviation and radio similarly drained the brains from competing areas later in the twentieth century. It would be surprising though, that something as universal and necessary as the bike just stagnated, particularly when you think of the massive popular following of bike races over the period to WW2. We do know that gears and brakes advanced over that period. And today, while bikes may not get their fair share of the available talent, plenty of capable people are working at improving them. There may even have been some feedback: Mochet's concern for air resistance and properly braced frames has some analogy with what was happening in motor racing at the same time (streamlining and multi-tube frames, going on later to true space frames).

Incidentally, Starley and Sutton's Rover came out in 1886, and although the safety bike took a few years to mature, the decline of the penny-farthing starts then, it having had about 10 years (from about 1876) as the dominant type. In 1896, Sharp said he thought production of penny-farthings had ceased. 1895 is a reasonable date for the maturity of the safety bike, however, as the diamond frame and the pneumatic tyre came a few years after the 'dwarf rear-driving safety' layout (Sharp really preferred the penny-farthing, or 'ordinary', as he always called it).

George

Thanks George

I had thought about the "push on the back of the seat thing" but honestly couldn't compare the biomechanics or effect of the 2 "low gear effects" so left out the recumbent alternative in the interests of simplicity. Have never really ridden a recumbent that didn't have a reasonable gear range.... What amazed me was not the slow development of recumbents but the slow development of effective wide range gears. I think it took from about 1900 to early 1970's for wide ranging gears to be regularly installed on bikes, during which time man had been to the moon, made plane travel commonplace, paved cities for car travel and learned how to make nuclear bombs. So I think there was a general brain drain from bikes, and recumbents were affected but possibly not much more than any other aspect of cycling.

Maybe we could publish your comments after my original piece in Huff?

George

I don't know, but here are a few factors which may have worked together. It is clear that a few people thought of recumbents long before Mochet made them workable and the UCI took against them, but they made little headway.

Money: in the late nineteenth century, professional men often used bikes for work travel, for instance putting the bike on the train and riding from the nearest station to where they were going. If a better safety bike had been available, they would have paid for it, just as they paid for complicated tricycles. They would have been the early adopters, whose high prices funded development and early production. But in the Edwardian age, those people increasingly went over to cars, and bikes were the preserve of working men, children, academics and the clergy -people with no money.

Mass production: Penny-farthings were made to measure for toffs, the critical measurement being the inside leg. The larger the front wheel, the faster the bike went, and the closer the wheel came to tender parts. All bikes being expensive, bikes produced in small quantities weren't necessarily particularly expensive. With the switch to safety bicycles, the number of bikes built went up greatly, they became a lot cheaper, and a wide range of fundamentally different designs was replaced with a narrower variety of basically similar diamond frames. That led to the economics of producing novel bikes becoming like they are today, or were very recently: you can get a diamond frame bike for \$500 and a recumbent with similar components for \$2500, the difference being the higher cost of small volume production.

Roads: Victorian roads were shocking, quite bad enough to mask incremental increases in bike performance and comfort. A lot of French and Belgian roads were just as bad until well after WW2. The smooth tarmac roads we whizz along are motor roads. Bad roads, mediocre brakes and balky gears don't make recumbents impossible, but they might be enough to make them no better than diamond frames.

Chains: Victorian bike chains were even worse than the roads, and it seems that the ruling passion of many a Victorian cyclist's life was a blazing hatred of a greasy, heavy, expensive block chain that kept falling off and jamming until it wore out. (Until Dr Dunlop introduced them to punctures, that is.) The Rover was introduced soon after chains improved to the point at which a switch to chain drive was thinkable, but long before the modern Renold chain became standard. But a chain twice as long and heavy as the chain on a Rover, and many times more apt to fall off, was still a big ask.

That actually provides a context in which the UCI ban may have had real effect. If the doctors and lawyers no longer bought bikes, the other early adopters whose money might have paid to perfect the recumbent were the racers. But they were excluded by some combination of the ban itself and the need to race bikes which were like the machines ridden by the sport's supporters, they being mostly working class.

I'm not so amazed about the gears. I clearly remember in 1970 seeing a man mucking up a gear change with a derailleur, jamming the chain and being thrown off his bike in a somersault. (I avoided derailleurs for over 20 years after that.) What works with racing mechanics to keep it in good order need not work for the man in the street, even if the kit he bought was as good as they put on the racing bike. I'm more amazed that bike gears not only mostly work, but they tend to fail safe.

I don't get the biomechanics either. But the notion that gravity helps you pedal if you stand up in the saddle strikes me as just bad physics. You have to use muscle power to lift the leg, before gravity helps it down. I suspect what really happens is that in that position you push against your arms holding the handlebars. If that's all, pushing on the back of the seat should be exactly as good. Perhaps you use additional muscle groups (flexors to lift the leg, extensors to push the pedal) but that won't provide additional energy, once you've used the glycogen stored in those muscles.



Pete Heal reported small attendances for the **Canberra Winter Race Series**: “Bad weather and flocks of kids on bikes and scooters invading the track did not help! May try and reestablish some racing in warmer months but that is when the conventional bikes seem to book the track out.”



Bike Budget Bring it Back!

OzHpv members including Alan Ball, Robert Waryszak, Graham Signiorini and Steve Nurse were amongst protesters who gathered recently at the infamous Gipps St steps in Melbourne. The steps represent a major obstacle on the bike path along the Yarra – one that families with young children and those with disabilities find hard to traverse – and one that Premier Baillieu promised to fix when he came into office and later “unpromised”. Hundreds of cyclists gathered at the protest which was organised by Bike Network Victoria. The theme of the gathering was “Bike Budget, bring it Back”. It seems like the protests may have had an effect! ([see here](#))



Bike Visor Mirror by Steve Nurse.

This story started a while ago when I made an oversize [visor](#) for for my helmet. The visor makes me more visible at night and has solved or improved the riding problems of rain in the eyes, sun glare and sunburn.

About 2 months ago I was riding from Airey's Inlet to Torquay and looking in my handlebar mounted mirrors. And it occurred to me that a mirror on the inside of the visor could take the place of both left and right handlebar mirrors. It took a while for me to do anything about this idea, it bubbled away till eventually I had a go at making something. Old cd's and bike mirrors and corflute were cut up to mount on a visor but either the visual quality wasn't good or my cutting was bad and I gave up eventually. Some research found the term "acrylic mirror" on [this](#) (beer view mirror!) instructables page, and I started looking for a supplier and cutter of acrylic mirror. And I found one in [Australian Sheet Traders](#) and ordered some rectangular acrylic mirror cut to size.

The parts arrived on a Monday and I wasn't very happy. Mirror all blurry! After emailing the supplier, one of their reps came round promptly and sorted things out. It was just an extra protective film of plastic on the mirror surface. So it was OK, and many thanks to David at AST, Christine and Ermi for sorting it out.

So now the mirror was built into a visor and it works! A slight tilt of the head is all that's needed to see the road behind, there are no vulnerable "stalk mirrors" to manipulate and potentially get damaged, and there are no mirrors on the handlebars. In the setup I have at the moment, I can see my eyes in the centre of the mirror but it doesn't bother me. I feel that building in adjustment to the tilt of the mirror relative to the helmet would improve things but I'm happy enough for now.

Next step is to find out if its been thought of before and the answer is a definite yes. This [link](#) shows one similar patent. So do I stop now? No, I don't think so. For the moment I will improve the mirror system for my own use.

There was a product that provides an integrated mirror in a bike helmet. The [Reevu system](#) uses mirrors to provide a rear-view using a sight-path above the riders head. The manufacturer's web page (previous link) does not seem to be connected to the [Reevu main page](#) which concentrates on motorbike helmets. However a [review here](#) indicates that the writer has great enthusiasm for the product and hopes that the product will again be on sale "the year after next". (in 2009!)

As well, the Vizor - Vu, shown at the bottom of the page [here](#) is something very similar. It is designed for motorcycles and was most famously worn by Steve Mcqueen in the film "On any Sunday".

Others in Ozhpv have turned their thoughts to helmet visors as well and [this link](#) provides a plan for a visor and the photos down the bottom of [this page](#) show Pete Heal and the visor in action.

If any OzHpv member wants one of the acrylic mirror strips sent out to them send me an email and include your snail mail address , steve@modularbikes.com.au.

Coming Events:

Geelong Race Days, October 28 and November 11 2012, details at <http://ozhpv.org.au/>

OzHpv Rally and Annual General Meeting, To be held at Myrtleford Victoria based at the Myrtleford Caravan Park from Wednesday 28 November to Sunday 2 December 2012, all types of rides, bikes and human power vehicles catered for. More details to follow shortly at <http://ozhpv.org.au/>

The World Human Powered Speed Challenge will be held from September 10th to 15th in Battle Mountain, Nevada, USA. Fun to follow even if you can't be there. Details at <http://www.recumbents.com/wisil/whpsc2012/speedchallenge.htm>