HUFF
Head Up and Feet First

OzHPV can be found at www.ozhpv.org.au, or contacted by mail at OzHPV Inc, c/o 3 Prendergast Street, Curtin ACT 2605

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From The Editor

Hi and welcome to Huff for September. We need you articles! Please put in the extra effort after your HPV builds or activities to report to Huff – immortalise your experience and make life simpler for your Huff editor! There is enough Human Powered vehicle activity carried out by OzHpv members to fill several hpv journals this size, but huff@ozhpv.org.au doesn't always get to hear about them.

I plan to step down as Huff editor after this issue, and take things a bit easier after working on both Huff and the OzHpv challenge this year. Hope to see you soon at the Challenge in Bendigo. Even if you don't want to compete there will still be lots to see & do & try & volunteer for.

In other OzHpv news, Andrew Stuart has stepped down as our webmaster, and Pete Heal has taken over temporarily. Thanks for your efforts over the last several years Andrew.

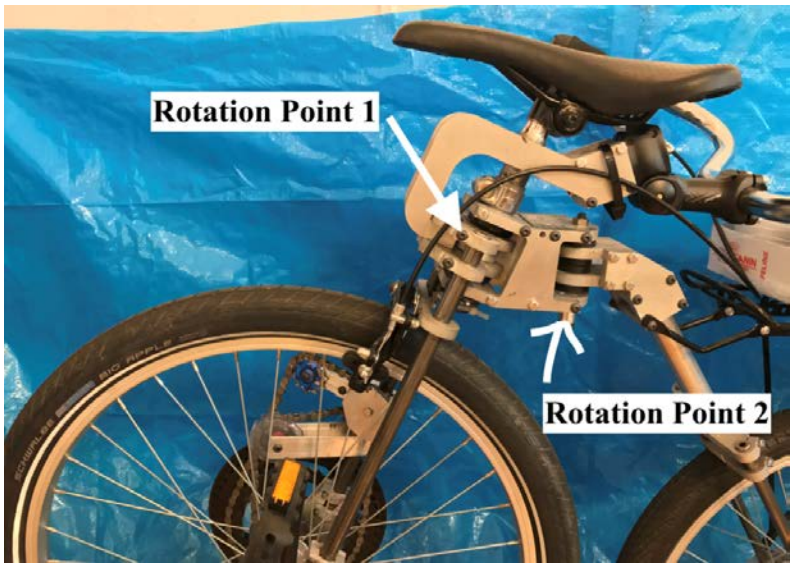
There will be no Ford Proving Ground speed event this November, but it should be returning bigger and better than ever during Easter 2018. There have been some WHPVA discussions regarding rule changes to the flying 200m. Anyone who would like to know more should contact Tim at tscorbet@yahoo.com for more information.

Regards Steve Nurse

Spotted!

Baz Furniss saw this surfboard carrying trike rig at Middleton a few months ago and posted his pic to the very active Adelaide Recumbent Riders group page where there are hundreds of (mostly) trike related posts. A recent outing for ARR was the Port Adelaide pirate day, and Rob Schueler organised these pirate-related t-shirts for the event.

Bell Cycles USA, Steve Nurse with Alex Bell



A few weeks ago, Alex Bell from Bell Cycles (https://www.bellcycles.com/) in New York contacted me. Alex has developed a small bike which is front wheel drive and has the seat mounted just above the handlebars. There are 2 pivot axes, one is in the place of a standard head tube, and one sits just behind. The chain runs over a series of pulleys to step up the gearing. The whole of the back of the bike is modular and Alex swaps out the simple back wheel and frame for a whole range of options. As well as the website, Alex posts videos to facebook at https://www.facebook.com/Bellcycles-280209829113392/ and reports and photos to his blog at https://www.bellcycles.com/blog/ . The blog site is quite revealing and shows several mutant unicycle creations and prototypes. I emailed Alex with a few questions for Huff.

SN: The riding position of the Bell Cycle is unusual, it's like sitting on the handlebars of a penny farthing and pedalling, yet you seem to handle it well in traffic. Did you have to work hard to learn to balance?

AB: It takes a regular bike rider anywhere from 15-30 mins of practice to be able to ride. So not like just jumping on and going. Although the trike version is pretty easy. I feel very comfortable on the bikes now and have no trouble balancing/steering in between cars/trucks in NYC traffic.

SN: The bike has in-and out gearing driving the front wheel. How many gears does the bike have? How does the bike handle the hills?

AB: Most of the versions in the videos are single speed. The chainring mounted on the crankset loops through 2 jockey wheels to a single speed freewheel on the wheel and

then back through 2 jockey wheels to the chainring. I have a version that I am still working on with a 9 speed cassette and a derailleur for choosing between the 9 speeds. I would say the hills are the same as on my fixed gear "normal" cycle although I haven't figured out how to pedal while standing yet, so very steep hills are difficult.

SN: Do you plan to sell the bike as a kit?

AB: Yes, I plan on open sourcing all the designs so anyone can make their own as well as offering a hopefully inexpensive kit for others to bolt together and try.

SN: There are some impressive extensions to the bike shown on your facebook vids and I did a few screen grabs, you have trikes, load carrying and electric versions as well as a helicopter type video camera mount which does my head in. I'm impressed!

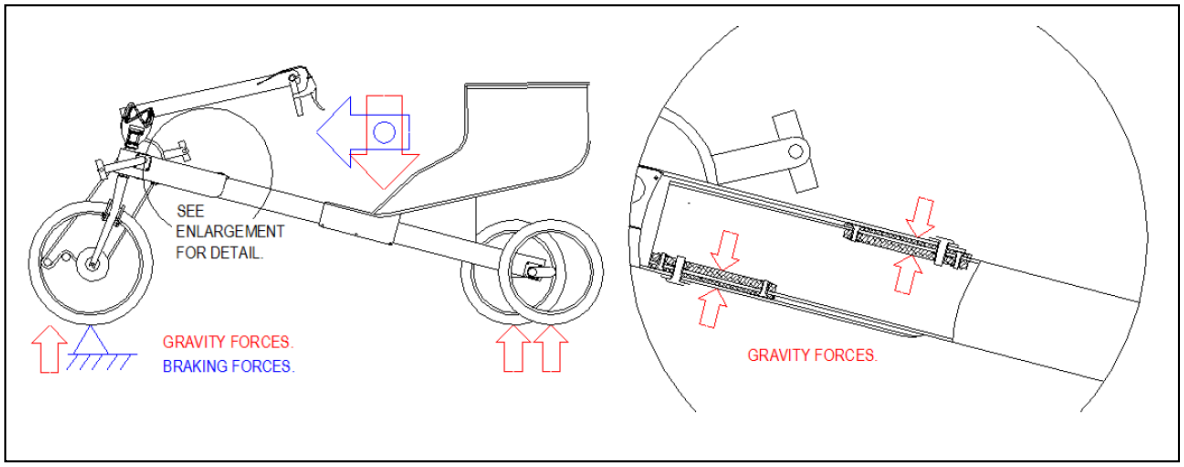
AB: Yes, the cool thing about the cycle geometry as I previously mentioned with the two pivot points is that you can pretty much stick anything behind the last pivot point and it will just "caster" or follow you. So I just bolted a 2x6 piece of wood as the rear wheel and could ride it well. The turning circle was not great. After releasing the designs and the first kit, I may focus on the cargo aspect.

SN: Thanks very much for the interview Alex. One last question, you mention crowdsourcing on your website, are you getting ready to launch that?

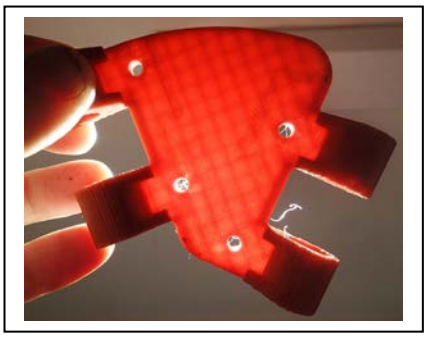
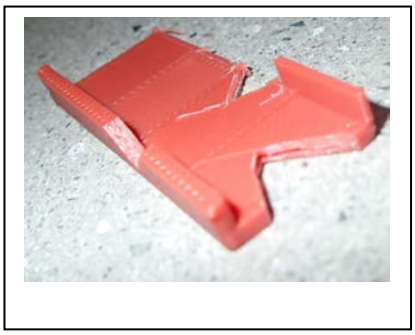
AB: We plan to launch within two months or so and are currently working with suppliers to keep the kit price below USD 200. Thanks!

3d Printing and the 40 trike by Steve Nurse

This year I helped at the Ford / OzHpv meeting where Glen Lacey raced and set the World WRRA over 50 hour record for an unfaired trike with 36.4km. I don't really have much concept of speed on HPVs as I often ride without a speedo, but I'm over 50 as well, and 36.4kph (what the hell, lets say 40) doesn't sound too fast. There was an old trike frame in the shed and I've started restoring it to go fast as an unfaired trike. I'll probably never break Glen's record, or if I do some other geyser on a Greenspeed Aero would have broken it already, but its nice to dream!



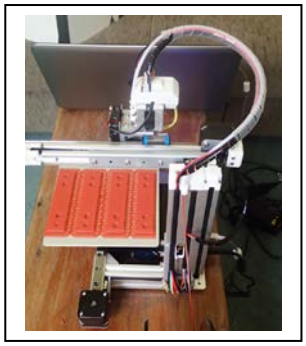
Forces diagram for the printer spacers.

Prototype spacers on the frame, typical hollow (honeycombed) 3d printed part, sample part printed to establish what part thicknesses to use so parts are printed solid.

This is a patient, long term project, and I decided to upgrade the prototype version frame spacers (they are plastic cushions which keep 2 halves of the trike together, mainly supported by gravity) with versions printed at home.

Home 3d printers are decreasing in price rapidly and earlier this year I jumped in and bought one called a Cetus. My recent Uni course gave me a bit of confidence using them, but starting with this printer was still a bit like jumping in the deep end of a swimming pool. But gradually I've gained some confidence with it.



Printing some parts, Brown parts are glued together to form the equivalent of the white part, rideable but not threatening any records yet.

With its current software, the Cetus won't print thick solid sections, and solids are needed for these parts as hollow parts would just crush. So I worked out what maximum thicknesses I could print, then sliced up the spacer part into 4 pieces. The H-shaped pieces were printed vertically and I didn't want to make them too tall, so I kept their height to 65mm, half the length of the previous parts from Shapeways over in the USA. I think my home printed parts have fewer air-miles.

The spacer bits were glued together and fitted fine but that was only one part of the restoration process. I found and fitted a large 59 tooth chainring to keep the cadence low at the higher speeds and went by the seat of my pants to make a laid back timber mount for a fibreglass Performer bike seat supplied by Alex McNee. I've added to that the mother of all tiller steering systems (0.9m long), some brakes and a gear changer.

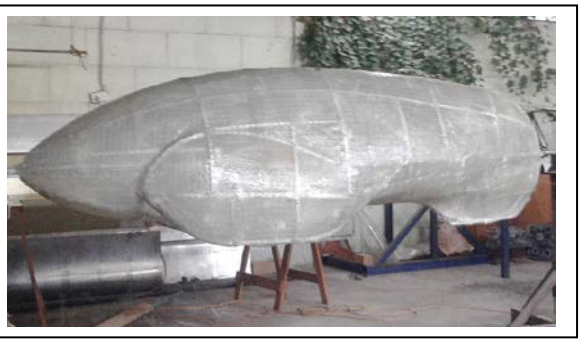
Last night I took it out on the road for the first time but it's still definitely a work in progress. This leaning trike needs limbo-like movements just to avoid the handlebars and get on the seat, and I can't see traffic using my helmet mirror because my head is tilted back on the wrong angle. Currently the ideal spot for this bike is a closed, mostly empty velodrome. No speedo fitted yet, and there are lots of aero features I can add to the trike and still stay within the WRRA rules. Glen, your record is safe from me for a while at least.

“Project Aero”, a new Australian Velomobile.

Yahl Primary’s Aluminium monocoque, PACII mileage marathon car.

Brett Turner is from Yahl near Mount Gambier in South Australia and is starting a velomobile and pedal prix business. He used to work as an aircraft engineer and his company finished off home-built aircraft from the frame structures built by makers to fully equipped flying machines. This involved working with aluminium sheet, monocoques / structural shells, electronics, and composites ranging from fibreglass to kevlar to carbon. When Brett’s children’s 90 student school wanted to enter a pedal prix, but didn’t have a race trike, Brett stepped in to make one. Scanned photos of the Pac Car record holding mileage marathon vehicle helped Brett design Yahl primary’s aluminium monocoque velomobile.

Having made one velomobile, Brett couldn’t stop and has set his sights on completing a new composite machine for the Maryborough RACV Energy Breakthrough in November. After that he plans to build road-going velomobiles and has some preorders. The composite velomobile is in production and photos are being posted to the OzHpv facebook group as it is being built.



Plug used as shell mould, Composte velomobile nearing completion

Here are a few details:

Cooling:

Velomobiles can get very sweaty when the sun shines and there is no motion to help cooling, so Brett has built batteries and 69mm fans into the machine. These are not needed above 25kph when the velomobile motion provides enough air. The velomobile has ducts which double as structural elements in the monocoque frame. There is room in the ducts for storing ice blocks if extra cooling is required.

Construction:

The new velomobile has about 12kg of wheels, steering and suspension hanging off a shell which is mainly from a fibreglass / foam / fibreglass sandwich material but reinforced in stressed patches with Kevlar and carbon fibre. Running gear includes suspension and is connected to the frame with chromoly steel and cast aluminium parts. Brett is aiming for a total weight of 23kg.

Versions:
Pedal prix and transport velomobiles have different requirements and Brett will be building the same machine with options to suit each application. Pedal Prix vehicles will comply to standard AIPP rules and have a quick release bottom bracket, seat belts and chain gobbler to accommodate riders of different heights. The road going version will accommodate riders up to 190cm (6'3") and have 33cm of bottom bracket adjustment as well as a rear suspension option.

For the moment Brett is calling the velomobile "Project Aero" and he can be contacted by email on customaero@hotmail.com

Review: Radbot 1000 rear light by Steve Nurse.

My friend George Durbridge came round a few weeks ago on his Linear bike and he had an impressive set of lights on it. I asked him about them. The front one was a "Cosmic Dreadnought" which looked great, and the back was going between bright and dim and flashing. I've been happy with my front lights (when they don't get stolen!) and use Cygolyte Metros, however my back lights needed improvement. For a while, I've bought cheap taillights for my HPVs but they always needed some form of modification to fit on my vehicles. As well, they have been prone to falling off when rattled by train tracks or other bumps.

I always try to comply with Audax lighting rules, not just because I go on the occasional Audax ride where they are compulsory, but because they make sense when riding at night. They recommend redundancy in lighting, and currently require: "two independent rear lights available for use (i.e. attached to the bicycle or carried) and one must be fixed to the bicycle or to a secure accessory (eg a rack or saddle bag) and at night or at times of low visibility at least one rear light must be illuminated and a rear red reflector must be permanently fixed to the bicycle".

So I trotted off to where George got his lights, White Cycles run by Steven White in Fitzroy and bought two of them. Cost is about $35.00 each and they come with non-rechargeable batteries and include both light and reflector. Fitting the lights was easy because they come with solid fasteners and several different mounts including a "T" shaped one that can be used as a hole cutting template on timber, cloth, steel or anything else.

At first I wasn't satisfied with the lights. I would ride with them on, and then on stopping would find they had spontaneously switched off. After a while, I worked out this was just what happened when using the lights with non-rechargables running low. Since then, switching to good quality rechargeables (Duracell Duralocks) has fixed things a bit, my only issue now is batteries in both the Radbots in use going flat at the same time. With rechargeables, the lights don't work at all when they go flat. Now I highly recommend these lights, they offer quality at a reasonable price. They are favourably reviewed on Road CC, but the review I found was from 2012 so the lights are definitely not leading edge technology.

Derek Gurban's Quadbike.

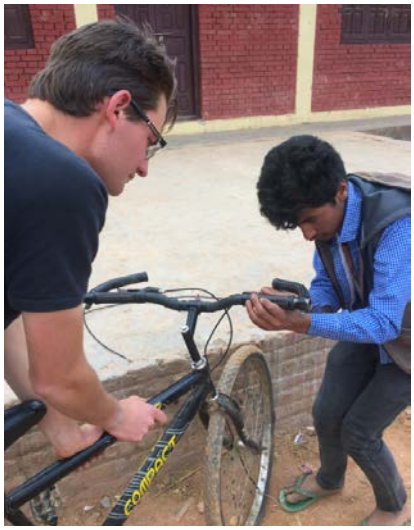
(Derek is a final year industrial design student at Monash University, and part of the Monash Human Power Speedbike team)

After spending time in Nepal fixing bicycles for local children, I noticed how resourceful and ingenious everyday design is in the developing world. On returning home, I wanted to make a low cost cargo vehicle for the workmen and small business owners that I had made friends with.

Daily life and work revolves around physical labour in developing countries. Manufacturing, construction and agriculture are their economic backbones, carried out by both big and small business. And while transport solutions exist for big business owners through vans, trucks and freight services, for small businesses finding a way to move goods, produce or equipment without financial risk often proves much harder.

Consider a small subsistence farmer, growing produce for their family and extra to sell, who needs a convenient way to move goods to markets, to transport fertilizers, seed, fence posts and other miscellaneous goods. Any form of motor vehicle is out of budget and too expensive to pay for fuel and maintenance. Bicycles, while financially accessible, and easy to maintain, don't have the cargo capacity to solve this problem.

A solution to this problem is to take the positive characteristics of the bicycle and fabricate a completely new vehicle. This transport will fundamentally be hard wearing, adaptable to different applications, mechanically simple, light weight and most of all, cheap. Additional to these characteristics, the vehicle is easy to fabricate with some experience, and promotes a clean and healthy lifestyle.



The quad bike took 6 weeks to complete from start to finish, with roughly 120 hours spent fabricating. Comfortably supporting two adults and cargo, the cycle truck's full suspension makes off road treks just as cruisey as a midnight maccas run. And unlike your pet goldfish, the cycle truck can handle serious neglect and still hum along when you need to move the goods.

The cycle truck is far from complete- In the coming months I envisage adding an electronics system, electric motor and headlights, as well as creating a removable, lightweight cabin and modular cargo system. And as for my overseas friends, I hope in the near future when my fabricating skills improve I'll be able to go back and spend some time making bikes for the great people I met. Only time will tell!

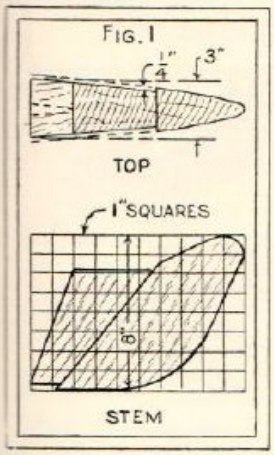
500 Projects Part 2

Here is a further project from The Boy Mechanic book mentioned in the last Huff. It was published in 1952 and the Human Powered boat shown here looks surprisingly up to date.

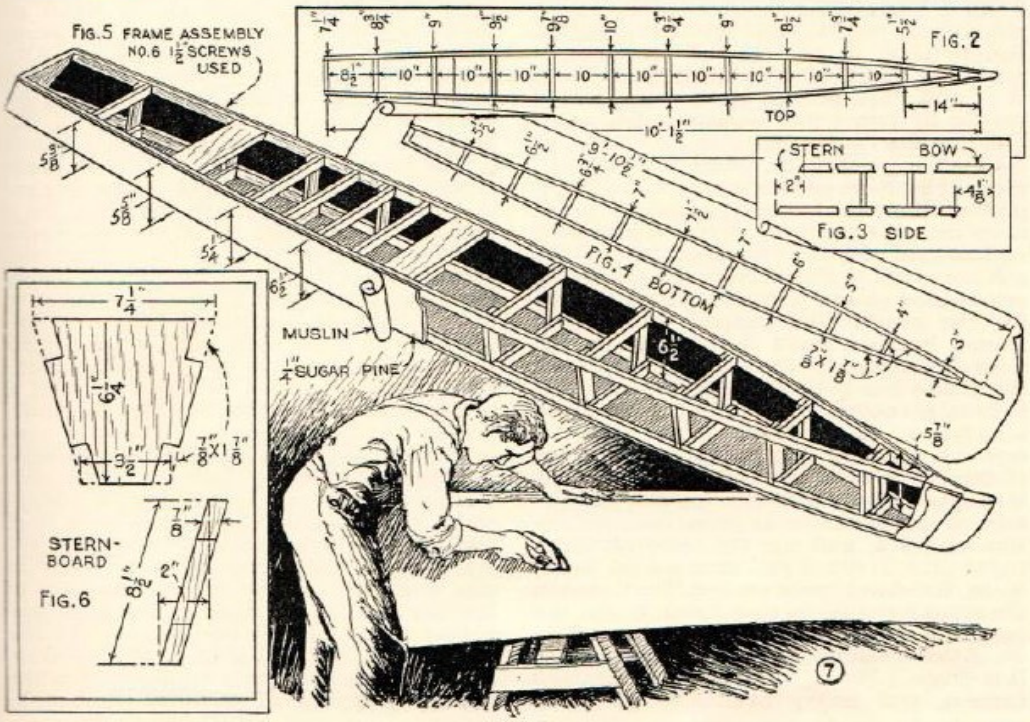
TREAD THE WAVES

On This Bicycle Boat!

BUOYANCY and speed are two features of this bicycle boat. It consists of two pontoons and an old bicycle frame, held centrally above and between the pontoons. Propulsion is obtained by the use of a ring-and-pinion gear, bolted to the pedal sprocket, and a small three-blade propeller connected to the gears by a suitable shafting. The frames of the pontoons, both of which are exactly alike, are made of 1 x 2-in. white pine, which, when dressed, is exactly ⅞ x 1⅞ in. Dimensions for the top and bottom crosspieces and



Pontoons for your bicycle boat can be made as shown or adapted from war-surplus airplane belly tanks



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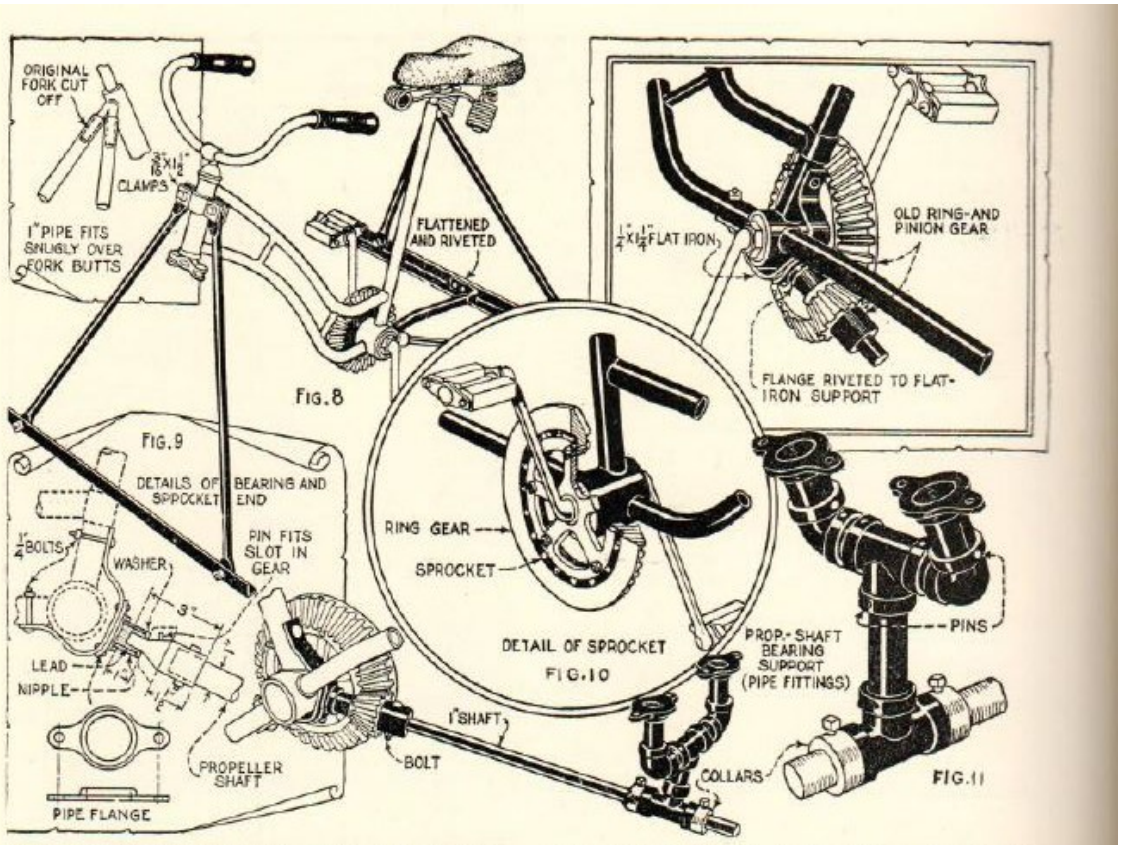
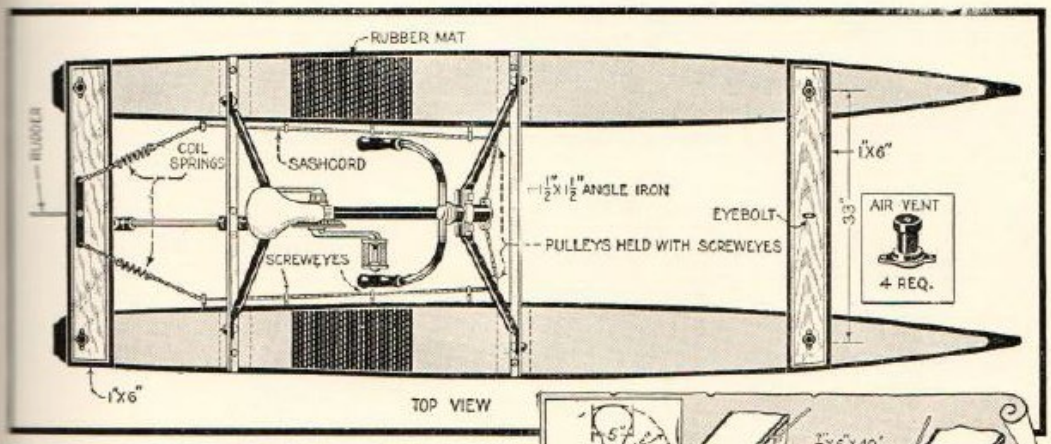
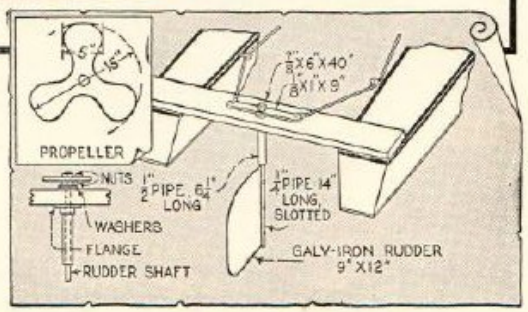


their spacing are clearly indicated in Figs. 2 and 4. Each frame consists of four pieces glued (marine glue) and screwed together, and notched to receive the longitudinal members—sheer and chine battens. Both stem and stern are set at an angle, which should be taken into consideration when building the frame (see Fig. 3). Details of the stem or nose block, which is cut from a piece of 2 x 8-in. spruce, are given in Fig. 1, part of the side being recessed ¼ in. to take the side planking. Exact dimensions and method of cutting the stern from ⅞-in. ash are given in Fig. 6. Note the additional reinforcing pieces provided across the top for the braces that support the bicycle frame, besides those that reinforce the deck directly under the rubber mats. When the frame has been finished, the side and bottom planking, which is cut from 12-ft. lengths of ¼ x 12-in. sugar pine, is screwed on after the contacting portions of the frame have been covered with marine glue. Then, with the top off, the inside of the pontoons is given an application of paint, and the top, also of ¼-in. sugar pine, is glued and screwed on, using ¾-in. flat-head brass screws. The heads of the screws should be countersunk, and the resulting holes filled with hard water putty. After sanding each pontoon smooth, it is given a liberal application of airplane cement, and heavy muslin is stretched over the surface. A hot iron is used to press the cloth securely to the wood as shown in Fig. 7. The seam should be made along the upper edge, where ½-in. half-round molding is applied, this being screwed on. A spruce keel of ⅞ x 1¼-in. stock is screwed to the center of the bottom of each pontoon. It is neatly joined to the stem, after which a strip of brass is run over the stem and a few inches along the forward part of the keel. Each pontoon is provided with two air vents made up of pipe fittings, to prevent the pontoon from bursting when the air inside expands in the heat of the sun. Be sure to apply glue to the fittings before screwing them in place over small holes drilled through the deck, to make them watertight. The pontoons are finished with a priming coat of shellac, four coats of good-quality exterior paint and finally a coat of spar varnish. Any desired color scheme may be followed.

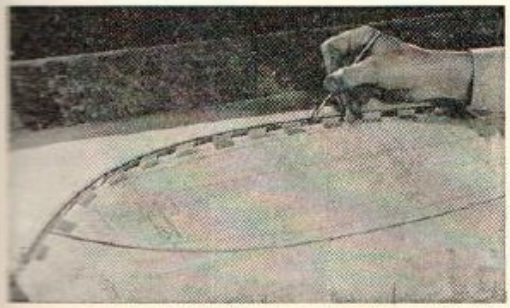
Next comes the adaptation of the bicycle. A girl's bicycle is best, since the lack of a crossbar affords more convenient mounting. Cut off the front and rear forks as shown in Fig. 8. The bracing consists of lengths of pipe, flattened at the ends and bolted to angle-iron crosspieces. At the front end, flat-iron clamps are used to hold the braces to the steering post, while the rear pipes are slipped over short stubs





or butts of the original fork, directly under the seat. The pipe should fit over the stubs snugly, and it has been found best to heat and slightly flatten the joint after assembly, so that it cannot come apart. One of the horizontal frame members, originally used to support the rear wheel, is cut off nearly flush with the housing of the pedal-crank bearing so that it will not interfere with the ring gear which is to be added later. The corresponding frame member is cut off about halfway from the end, after which the cut portion is flattened and riveted to the rear angle-iron crosspiece. Fig. 10 shows how an automobile ring gear is bolted to the original pedal sprocket. It may be necessary to cut off the teeth of the sprocket to fit inside the recess of the gear. If desired, however, a brass disk may be substituted for the sprocket, in which case the disk should be the same thickness as the sprocket. A heavy piece of ¼ x 1¼-in. flat iron, bolted to the frame as shown in Fig. 9, holds a bearing that supports the end of the 1-in. propeller shaft. This bearing is made from a pipe flange and short nipple filled with melted lead and drilled to receive the machined fitting on the end of the shaft. If you have no metal lathe, this fitting can be turned out quickly at any machine shop. The tapered portion should make a snug fit in the pinion gear, and a small pin, driven into the tapered portion, serves as a key for the gear. A bolt holds the fitting on the shaft, while the latter runs through a bearing provided directly under the rear angle-iron crosspiece. This bearing and its hanger are made up of pipe fittings as shown in Fig. 11.

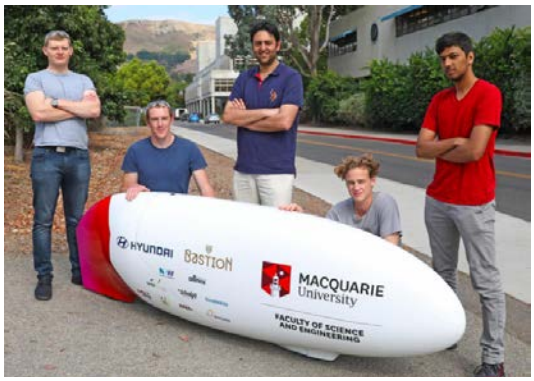
The angle-iron crosspieces are fastened to the pontoons with lag screws in the approximate positions indicated in the detail above, and additional crosspieces of 1-in. stock are provided at the front and rear. The pontoons should be placed perfectly parallel, 33 in. from center to center. Steering is accomplished by means of a small sheet-metal rudder, connected with sashcord to the front-fork stub of the bicycle. If a commercial propeller is not available, one can be made from fairly heavy sheet metal. It should have a 15-in. diameter, with a hole drilled centrally to fit the shaft, end of which is threaded so that the propeller can be held securely between two nuts. Corrugated rubber mats are tacked to the deck of the pontoons on each side of the bicycle, and the craft is then ready to go.



Boat-Drawing Aid

When fairing lines on a boat drawing, an inexpensive substitute for a naval-architect's spline and ducks can be improvised from a strip of plastic which is held in place on the drawing with tabs of masking tape. The plastic strip should be approximately 1/16 x 3/8 x 30 in. and the tabs are spaced 2 in. apart as shown in the photo. A pin pressed into the drawing board at each end of the strip helps hold the shape of the curve.

Macquarie Speed Team at Battle Mountain



Charles Easton-Berry reached a speed of 89.75km/h in the MQ1 Speedbike during the World Human Powered Speed Challenge held near Battle Mountain USA. They aim to be back and improve on their speed next year. Congratulations! (Photos MQ Speed Team Facebook and Biking in a Big City Blog)

Ride Groups and Coming Events

Geelong Recumbent Riders: Next ride is Saturday October 7 in Ballarat, see https://www.facebook.com/events/1657240964347742

Adelaide Recumbent Riders, meeting details via ARR facebook (https://www.facebook.com/groups/1536252520007893/)

NSW Recumbent Riders next meetup is October 21, details via NSWRR facebook (https://www.facebook.com/groups/519493954898058/)

Perth Recumbent Riders can be reached via their facebook page, https:/www.facebook.com/groups/498654353665784/

Brisbane Recumbent Riders meet regularly, details are available via facebook https://www.facebook.com/groups/986598251399938/

Canberra HPV Mob can be be reached via their facebook page, https://www.facebook.com/groups/256191544754773/

Coota Bike Festival (http://www.cootabikefestival.com.au/schedule.html), Cootamundra New South Wales An OzHPV rally is being planned to coincide with this festival on the weekend of October 28 and 29, 2017. More event Details on Facebook.

The **OzHPV Challenge in Bendigo Vic** will run on December 8, 9 and 10 and the complete entry form is available from the OzHpv Website . There will be social riding on December 8, track racing on December 9 and challenging Hill Climb and Road Race Events on December 10. Catered Accommodation is available at the Koolamurt Scout Camp in Spring Gully, Bendigo, about 4k from the centre of Bendigo and near the venues for Sunday Racing. If you don't want to compete, we are always in need of volunteers and track marshalls. Phone Steve Nurse (03) 94818290, or email huff@ozhpv.org.au . More event details on Facebook.