Catalyst

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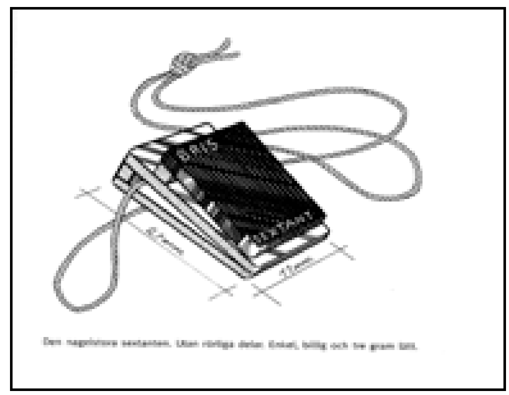

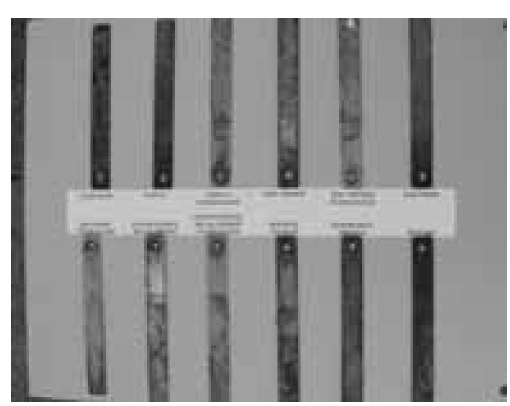

Features

Regulars

Cover Picture:
Kim Fisher's Revolution

Catalyst

Journal of the
Amateur Yacht Research Society

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Lateral Thinking and Resistance

Sven Yrvind is one of the most experienced if not one of the more well known small boat ocean sailors of our time. In the last 35+ years he has wandered across the Atlantic several times and rounded Cape Horn (twice?) in a 20ft boat, *Bris* (Swedish for *Breeze*). He was awarded the Seamanship Medal of the Royal Cruising Club in 1980, putting him into such august company as the Smeatons (*Tzu Hang*), Bernard Moitessier (*Joshua*) and Robin Knox-Johnson (*Suhaili*). Now he has built another small boat, in which he proposes to go wandering again.

This boat, called *Yrvind*, however has no keel or centreboard. Instead it uses the side of the boat to provide lateral resistance, augmented by two chine runners one each side. These are small lateral projections along the chine that discourage water from flowing around the corner and under the boat. Thus they provide lateral resistance. Similar devices were used by Prof. Walter Castles back in 1976 (AYRS booklet #83A) and they have been added with some success on a few Wharram catamarans since then; but they have had little visibility on monohulls until Matt Layden fitted then to his *Swamp Thing* in 1986, and then used then on a number of other small boats culminating with *Paradox* (1993) and *Enigma* (2005). With these boats he has cruised and raced along the Eastern Seaboard of the USA, proving the seaworthiness of his chine runners.

Unfortunately, Prof Castles' work on cusped vortex generators seems to have been lost (unless someone has a copy of his programs or can reconstruct them from the equations in AYRS #83B?) but I suspect that, like the design of winglets on keels and aircraft, there are significant subtleties in making efficient chine runners. Most people have seemed to have used flat plates of plywood, more-or-less streamlined, and more-or-less delta shaped, but though these seem to work, one wonders whether they are as good as they could be. Maybe you know better – in which case please write and tell us. (Email: catalyst@ayrs.org).

Together with the features on Malcolm Henry's delta rig and on Jon Montgomeqy's Powersail design in Catalyst 31, the features from Sven Yrvind and Kim Fisher in this edition are entries for the 2008 John Hogg Prize. Two more entries will appear in Catalyst 33, as will the results of the competition, which should also be announced at the London Boat Show in early January. Although as Editor I've read all the entries and have my favourite, I don't yet know the final judges decision.

More next time

Simon Fishwick
Editor

Kiteboards exceed 50 knots and (eventually) take the World Sailing Speed Record

French kiteboarder Sebastien Cattelan became the first man to exceed 50 knots at the Luderitz Speed Challenge meeting in Namibia in October, a World Record that was then broken at the same event by compatriot Alexandre Caizergues. He has now been recognised as the new World Sailing Speed Record holder with a speed of 50.57 knots. However the recognition of these records was not without incident.

Namibia is fast being recognised as the centre of the speedsailing record world in the same way as the salt lakes of the USA were for landspeed records. Its low coastline, and the constant, and strong, winds off the South Atlantic make it ideal for speedsailing, and a number of events have been held there in recent years. So everyone expected that the meeting in Luderitz in the last quarter of 2008 would produce good speeds, but no-one expected it would be quite like this.

Day 1 (Sept 16) of the Luderitz Speed Challenge and Bjorn Dunkerbeck sets a new open-water sailboard record of 44.7 knots.

Day 4 (Sept 19) Rob Douglas (USA, kiteboard) set a scorching 49.9 knots, then Sebastian Cattelan (FR, also with a kiteboard) blew past on the very next run with a claimed 50.1 knots. Sjoukje Bredenkamp (ZA) blasted her old record of 42.35 knots with a 45.1 knot run. However, those results were still to be ratified on video records and adjusted for currents by the World Speed Sailing Records Council official. Unfortunately for MCattelan, his speed was revised downward slightly, to 49.49 knots, leaving Rob Douglas claiming the world record with a corrected speed of 49.84.

Day 18 (Oct 3) and the magic 50 knot speed was broken by Sebastien Cattelan of France with a blistering run of 50.26 knots (93kph). A speed ratified by the WSSRC.

Then the very next day, Sebastien Cattelan of France, the first human being to sail at more than 50 knots, found he held a world record for only 24 hours as compatriot Alexandre Caizergues snatched it away with not one but three runs over 50 knots – reaching a top speed of 50.57 knots (93.65kph) in windspeeds around the 40 knot mark.

And then the world waited for WSSRC to pronounce.

And waited.

And waited.

And why? Because a number of years ago, the ISAF Council (to whom WSSRC reports) decided that kiteboarding could not be sailing, because competitive kiteboarders had their own governing body and it was not affiliated to ISAF but totally independent.

So WSSRC were permittd to recognise Alexandre Caizergues as holding the kiteboard world speed record, but not the outright one - which remained in the hands of Antoine Albeau who did 49.09 knots down the French Trench in March (no mean achievement, make no mistake!).

To be fair, part of the silence was due to delay in submitting the timekeeping records to WSSRC. However, rumours of the "political" nature of the silence incensed many in the kiteboarding (and speedsailing) world, and their anger was not reduced by a markedly ill-informed interview given to the New York Times by ISAF's Secretary General, which ignored the fact that the International Kiteboarding Association had now become affiliated to ISAF ten days earlier, as well as the work of WSSRC years ago in setting rules for kiteboard records. There was a world-wide outcry, and talk of legal action against ISAF.

Finally on 8th December, WSSRC were permitted to exercise their common sense and announce that they and ISAF recognised the kiteboard record as a new outright world record.

So we can now congratulate Sebastien Cattelan as being the first man to exceed 50 knots under sail, and still more congratulate Alexandre Caizergues as the new World Sailing Speed Record holder with a speed of 50.57 knots. The Women's World Record was also set at the same meeting by Sjoukje Bredenkamp and stands at 45.20 knots.

However that doesn't mean that other people were idle ...

L'Hydroptere produces record-level speeds too

From the beginning of October, "L'hydroptere"'s scientific team was really on the job. Runs made on 4th October, especially the fifth one, where a top speed of 52.86 knots was measured by Trimble GPS, were closely analyzed. The measurement system installed on the flying trimaran shows its importance here. The analysis of the efforts, acceleration and the synchronized videos made it possible to analyze with great precision the boat's behavior at very high speeds.

Until now, only the flight simulator and the calculations gave them a picture of "L'hydroptere" above the "Wind Barrier" (e.g. 50 knots). Today, the data comes from real performance. Thus, the team of engineers were able to consolidate the knowledge and further open up the realm of flight for "L'hydroptere".

Their clearly stated objective is to beat the absolute speed record, currently held by the kitesurfer Alexandre Caizergues, thanks to his stunning performance of an average of 50.57 knots over 500 meters.

Update on 30th October

Holders of the absolute speed record over one nautical mile and of the 500-meter record in Category D since April 2007, Alain Thébault and his crew improved their performances and established two new records:- an average of 43.09 knots over one nautical mile and an average of 46.15 knots over 500 meters (WSSRC ratified).

Accomplished off Napoleon Beach at Port-Saint-Louis-du-Rhône, with a northwest wind blowing at 28 knots and a small swell of 0.6m, these performances show l'Hydroptère's increase in power.

With these two new records under their belt, the Hydroptère Team is, step by step, drawing closer to the final goal: to break the absolute speed record over 500 meters.

Vestas Sailrocket going for the World Record as well . . .

VESTAS SAILROCKET scheduled its first WSSRC ratified attempts on the outright world speed sailing record over a 28 day period commencing 23rd November. The radical UK designed and built boat is currently based in Walvis Bay, Namibia and will use the steady local winds and flat seas to make her attempt. After more than four years of development and evolution, the team behind the VESTAS SAILROCKET project feel that the time is right to step in the ring against the official clock in the form of a WSSRC ratified world record attempt.

Project manager/pilot Paul Larsen —*"We have only called in the WSSRC because we feel we are ready. I feel that we are beginning to tame the beast... to get her under control. Real speed will only come with control. Only now do we feel that we have the boat we specified quite a few years ago. It's been one hell of a battle to get her to the stage where she is ready to go toe to toe with the best that have ever been. The last few runs we made have really boosted our confidence in the boat and what she can deliver. Going up against the official clock will focus the mind like nothing else. If the wind is right and VESTAS SAILROCKET is ready... I know what my job will involve. Personally I am more excited than nervous about the possibilities of what the next month or so may hold.*

VESTAS SAILROCKET has fought through a long and often cruel development process to reach this stage. It will be the first serious attempt on the Outright record by a UK boat since the legendary Crossbows I and II set the pace from 1972-86.

VESTAS SAILROCKET designer, AYRS member Malcolm Barnsley —*Reaching this stage has been a stressful experience from a design perspective. This boat represents our first stab at a unique concept of stability in sailing and we aren't just going out there to see it work... but rather to make this Mk I better than anything that has been. There were times when we thought the task would overwhelm us... but here we are. Sometimes, in many disciplines, just making it to the start-line is a huge achievement in its own right. In the context of this record, that's where we are now. I chose to pursue this design many years ago because I believed that it had the right ingredients to live in the knife-edge world of very high speed sailing. We shall soon see if it has what it takes to be the fastest ever. I don't expect it to be easy!*

Finn Strom Madsen, President Vestas technology R&D- *"We are on track and very pleased to be making this first record attempt. The team has worked hard to go this far. Now we look forward to having the fastest sailing boat on the planet"* The record attempt will take place out of Walvis Bay Yacht Club in Namibia from the 23rd November until the 20th December. The team will be on permanent standby to make the most of any weather windows that come their way. A successful 500m run required to break the outright record will only take around 19.5 seconds. There will be regular updates on www.vestassailrocket.com.

AYRS Committee and WSSRC Member Michael Ellison will scrutinise the timekeeping.

... and flips in spectacular style at 52 knots

from Paul Larsen, December 12

Hi all, well yesterday was truly epic.

The day shaped up better than forecast and I went over feeling strangely calm. Conditions on the course looked perfect, the sort of otherwise ordinary day that I always envisaged.

What was to follow was anything but ordinary. The seemingly innocent boat we pushed across the Lagoon was about to live up to its 'Rocket' title. It was a spark to a powder keg.

We stopped off at the timing hut to wait for the wind to build and swing. I tried to have a little snooze under the table. Surely enough, good ol' Walvis turned it on and away up the course we went.

I was determined to bag a record. I knew our wonderful boat had it in her to do something special and that at the top of the course... it was up to me to make sure she was allowed to do it. I had had enough practice... and this was no longer practice. This was a proper world record attempt. This was the dream. It was time to dig a little deeper, judge yourself as critically as you judge others. "what would you do in this situation". From the outside things are simple, from the inside... far more complicated. Sometimes you need to be inside with an outside perspective. I suppose having only one option is a calming thing.

The setup procedure was careful. I told the boys to take care as something we have all worked for was waiting down the other end of the course. Everyone left Venassius and me at the top of the course as they hurried back in the support RIB to take up their expectant positions. Things looked perfect. The boat was perfect. It was time.

There was enough wind to sail a 'flattish' trajectory onto the course. I built enough apparent to attach flow onto the wingsail with only a slight dip. We were off. I was quick to sheet in and get on the main flap whilst simultaneously switching from foot to hand steering. A real one man band affair. VESTAS SAILROCKET was going hard and I had tunnel vision. We had made an adjustment to the rig to stand it up a couple of degrees so as to hold the nose down and it seemed to make the boat ride flatter. Control was excellent. At one stage a gust pulled the nose away and I brought it gently back up. The main flap was in, but I noticed that the wing angle was still a little eased. It was too late to change. The boat was smoking... but balanced. I held onto it until I was certain that a solid 500 meter average was recorded... and then dumped the flap and eased

The flip - in a serioes of stills taken from the video record, which can be viewed on the Sailrocket website - http://www.sailrocket.com - and on Youtube at http://www.youtube.com/watch?v=EfJK5ycx_hg.

the wing. No more big bear aways to slow down. I pulled on the leading edge bridle to slow her down by feathering the wing and it worked a treat. Hiskia caught the boat on the shore. I was pretty surprised by the data on the GPS. It read a top speed of 48.90 knots and an average of 47.35! I told the team over the VHF that they were now looking at the fastest boat in the world and congratulated Malcolm on designing it.

There was no supernova of emotion, no tears... just huge smiles and a sense of arrival.

We did some pieces to camera and then carefully dropped the rig. Then we felt safe. It was only later when we checked the two onboard GPS systems that we saw we had actually hit sustained speeds over 50 knots peaking at 51.76 knots. We averaged 46.4 knots over 1000 meters. The mean wind speed was around 22 knots. VESTAS SAILROCKET had definitely arrived.

I reflected on the wing angle during the run and the knowledge that I could come in closer.... to flatter water. armed with this we headed straight back up the course. the wind was up a knot or so and the course was still lovely and flat. This was our dream day. We had plenty of time.

The wind was gusting to 25 on the second start indicating an average of around 22-23 knots... no more. I did an even flatter start up procedure focusing on getting the wing into 10 degrees as soon as she accelerated... and bloody hell... did she accelerate. Apparently she pulled 0.35 G's all the way up to 52 knots before the nose lifted. I expected her to step sideways as before but not this time. The nose floated higher... and then it went quiet... I was flying. I waited for some sort of touchdown... somewhere... but it didn't come. The nose just kept going up until I was looking vertically up at it! There was no rolling and I was just a passenger. It was still quiet... and strangely dry as we continued the loop. I sort of knew I was inverted. It all seemed to take so long. I consciously thought "righto boy, when this thing smacks down... get the hell out of it because you're gonna be upside down"!!! I smacked down hard. Like someone big had full palm slapped my helmet with all their might. I was out of that boat in an instant. I was a bit beat up and bruised... but alright. I lay on the upturned hull and got my head together. My helmet was broken but I dragged the mic. over to let everyone know I was OK.

Dammit!

[Paul sufferred no serious hurt from this accident, and the boat and he were back in action after a couple of days. WSSTC later ratified that first run as the B-Class record with a corrected speed of 47.36 knots. Now they are waiting for the wind to blow from the right direction at the right speed again for another attempt. -- Ed]

The small object at the stern of the boat with a spike projecting from it is Paul's head, with a streamlined fairing on his helmet! All pictures by Helena Darvelid/Vestas Sail Rocket

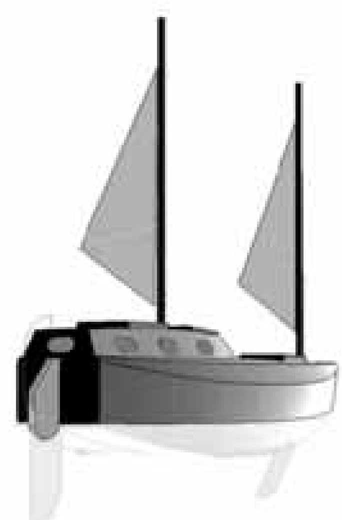
Aspects of *Yrvind*

A SMALL VOYAGING BOAT

Sven Yrvind

Two of the tourist's means of conveyance are the recreational vehicle and the bicycle. The RV gives its owner comfort and speed. It has beds, kitchen and a shower. If it starts to rain, there are windshield wipers. The cyclist uses a simple and environmentally friendly form of transport. He sleeps in a tent and eats outside, but cycling is sweaty work and during heavy rains he gets wet. Furthermore, compared to the RV he does not get far in a day – despite his feeling of speed. But, cyclists do not get fat, nor do they get bored – their bliss comes from within. Bike trips are known to be healthy and mentally enriching, therefore even people who can afford a RV go cycling.

At sea it's different. Although people paddle kayaks and sail small boats along coasts, normal people cross oceans only in big boats with beds, a kitchen and shower. If a small boat sailor leaves the coast he is deemed mad. If he successfully returns to land after having crossed an ocean, he is hailed as a hero. But what he has done is not madness or heroism, because the oceans are waste regions of wilderness, stunningly beautiful in their ever-changing magnificence. To roam them in a small, safe, environmentally friendly boat, propelled by wind and muscle-power, is healthy and mentally enriching.



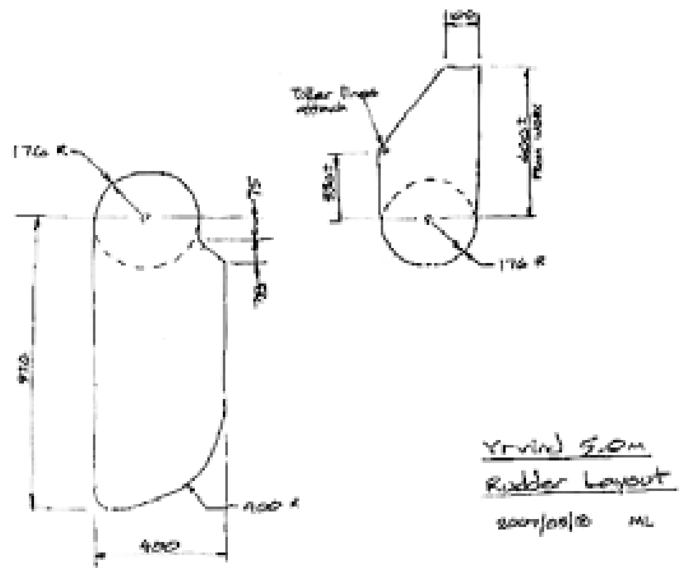
I must stress the importance of a safe boat because the sea is ruthless in its fury and a small boat, far out to sea, has no place to hide. Alone, without help, it must be able to survive storms of the worst kind. Some things are inherently dangerous. Fires, electricity and cars can hurt you, but we have not done away with them, we have made them safer and developed better ways to handle them. Ocean-going production boats are big not because bigness makes them safe, but because there is more money in big than in small boats, and much money spent gives the owner status.

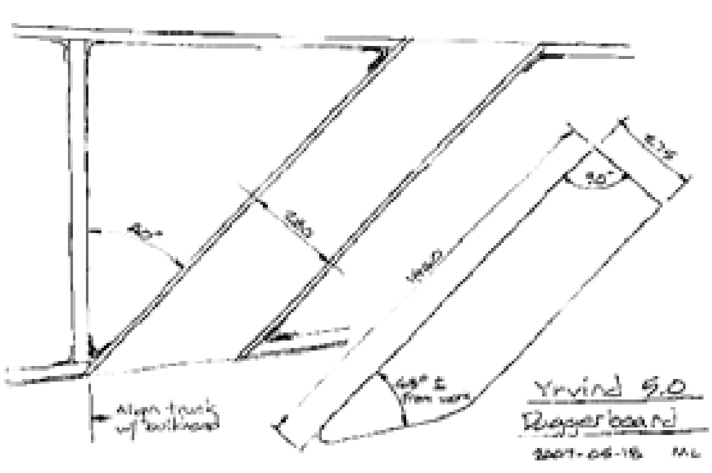
After decades of studying, designing, building and sailing small, ocean-going boats I do believe I have evolved a safe, functional design. Here is a brief description of *Yrvind*, my next boat in that series, embarrassingly named after myself. Her basic dimensions are length 16 feet, beam 5 feet, draft 10 inches. She displaces close to a ton fully loaded. In designing her I have had invaluable help from Matt Layden. To show her potential I hope to sail her non-stop from Bodo, north of the Arctic Circle in

Norway, around Cape Horn, to Valdivia in Chile, a distance of more than 12,000 nautical miles. Even if I have super-luck with favourable winds all the way, the voyage will take me more than six months. The windward offshore passage around Cape Horn should convince people interested in small boats of her weatherliness. The time spent at sea should also convince them of her autonomy.

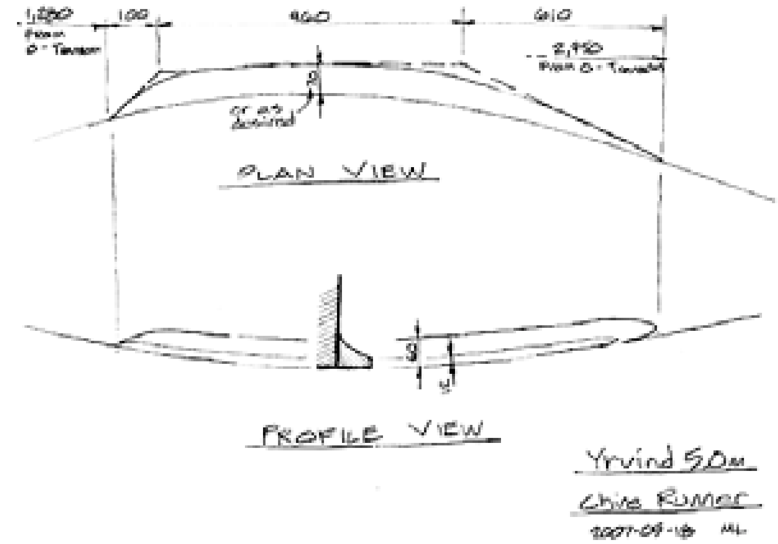
Anyone who walks along a beach knows that among the debris washed ashore there are bottles, boxes, bulbs and other small, fragile artefacts which have survived storms far out to sea and the merciless pounding on the beach, while bigger things have been broken up. The fundamental principal behind this interesting fact is called the square-cube law. It was first demonstrated in 1638 by Galileo Galilei. It states that as a thing gets larger, its strength increases by the square of the scale, while its stresses increase by the cube of the scale. This law applies to the global structure of an object. Unfortunately local stresses are totally different, and they are the small boat's Achilles' heel. There are a lot of half-submerged containers and other jetsam out there which will not bother a big ship but which can puncture a small boat's hull. My solution is to make Yrvind extremely tough, by dividing her into waterproof compartments and building her of so much buoyant material so that she cannot sink.

The impact on a free-floating object of a given mass is proportional to its weight, so lightness lessens the damage. It rolls with the punches. To illustrate this, make an experiment. Hold a walnut in your hand and hit it with a hammer. Nothing happens because the nut moves away. Put it on a rock and hit it, and it will crack, because it cannot escape and has to absorb the whole impact. A different way for an object to lessen the damage of an impact is to deform and spread it out over a longer time. Do another experiment. Put a piece of rubber on a rock and hit it with a hammer. The rubber deforms, but does not crack. *Yrvind* is designed with these two interesting facts in mind. First, she is light enough to move away when hit and her lightness also ensures that she creates less impact when she runs into something. Second, since the 1980's I have built my boats using an atypically thick sandwich core, in combination with a very strong inner skin. When hit with a blow that would be fatal to a production boat, the outer skin breaks and the foam gets crushed. This absorbs the collision energy and distributes the impact over a large area. The already strong inner skin is less stressed, and the boat is not holed. My small boats built along these principles are for all practical purposes indestructible. Any damage is cosmetic and can easily be touched up in the next port.



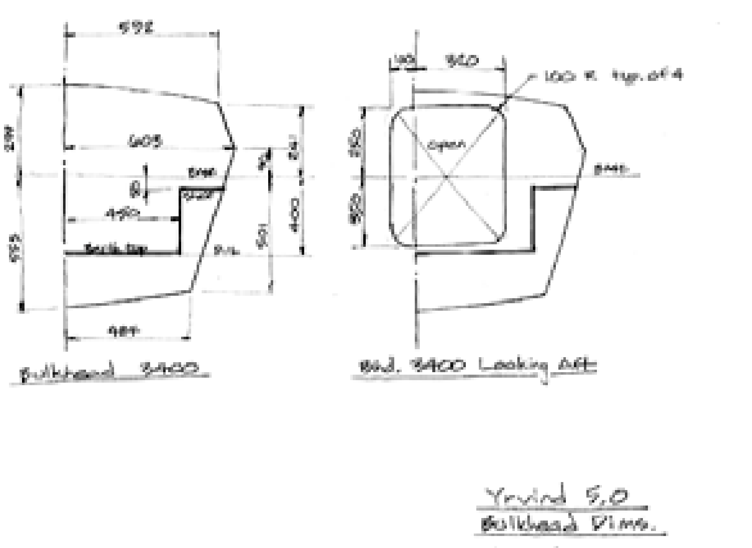


The interior climate of a small boat is often neglected. On short coastal trips this may be an acceptable compromise. But when I spend months offshore, I hate to have to fight condensation, salt and mildew. On a fifteen-footer that I sailed,

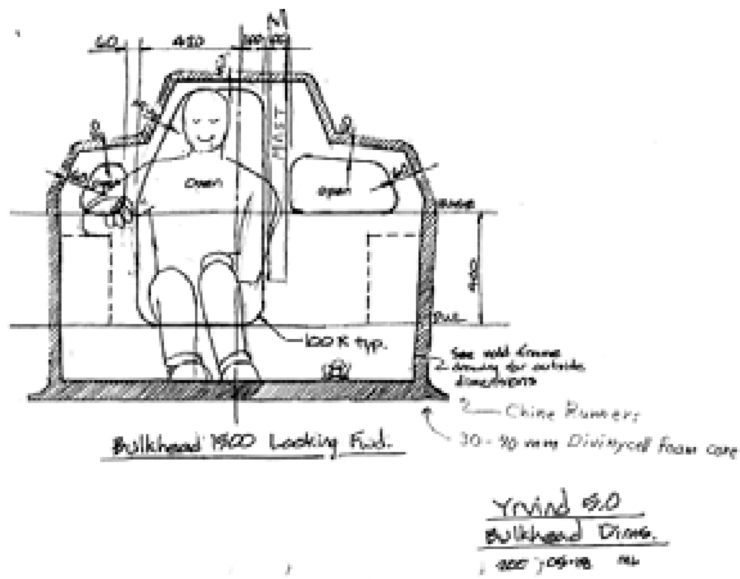


together with a young lady, from France to Newfoundland, I used two-inch thick Divinycell foam core in a sandwich construction. To get good and flexible skin adhesion I used a specially formulated NM-epoxy. The foam gave a warm interior surface. As water always condenses on the coldest surface, the boat's uninsulated windows were cold spots. I deliberately kept them that way because it turned them into condensation plates that effectively dried the cabin air. Handholds at their lower edges doubled as water collectors. Besides strength and insulation, the Divinycell gave so much flotation that the boat was unsinkable. She let us sleep through storms among the icebergs, dry, warm and without worry. Yrvind has two bulkheads. In bad weather they are closed, dividing her into three watertight compartments. The two compartments at either end serve as anterooms, trapping any rain and spray that might come in through the hatches, which in fine weather can stay open day and night. Many times I have suffered from a stiflingly hot saloon. The worst times have been when south-bound, leaving the Atlantic north-east trades to cross the equator, where one meets the south-east trades head on. At that point the wind is southerly and one has to be close-hauled not to be swept around the corner of Brazil by the equatorial current. Banging into the big waves causes spray to fly all over the boat. On previous voyages, I have had to sail with the hatches closed, causing the cabin temperature to reach nearly 37ºC during the hottest time of the day. I think that's too much, especially for a Swede! Now with this new arrangement I hope to be able to have a fresh breeze flowing through the cabin at all times. At other times, when one is driving the boat hard in high winds with breaking waves, the hatches have to be closed because of risks of knock-downs and capsizes. Then, fresh air will enter *Yrvind* through ventilators equipped with ample Dorade-boxes. These normally do a great job separating air and water, but when conditions are really bad, they do not always function as intended. On production boats any water not trapped by the Dorade-boxes will enter the boat as a shower from the roof. My solution is to duct the air to below the waterline and across the bottom to the opposite side in the anteroom. There the excess water will harmlessly spill out on the floor. Perhaps the greatest advantage with this arrangement is that it prevents water from flowing into the boat when it is upside-down, as the opening in the ducts will then be above the waterline. This arrangement ensures that the middle compartment, with my bed, books and stores, will always stay dry.

There should be a place for everything and everything should be so well secured in its place that it stays there even when the boat is upside-down. When there is a place for everything it is

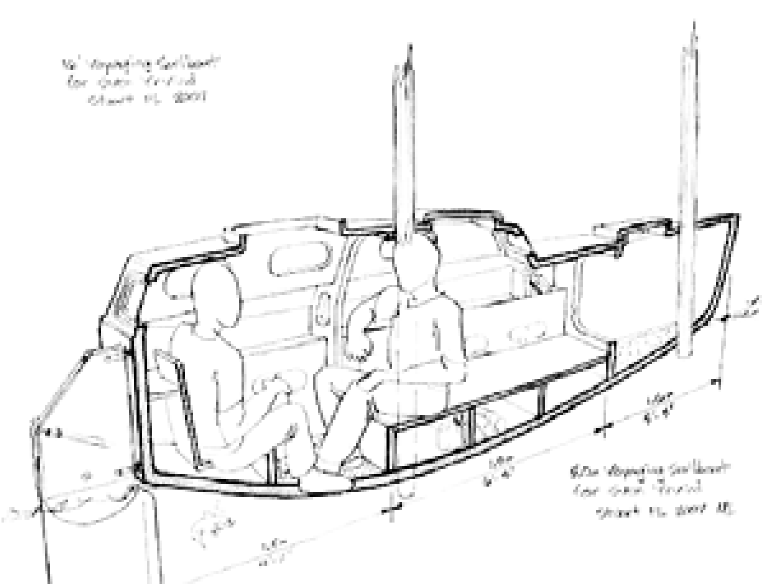


easy to keep order even through exciting times. I consider myself to be one of those things that should be kept secured. In Yrvind I will use a safety belt to prevent myself from being thrown around. In addition to that I will have a pilot-type leather cap on my head. Attached to the cap will be another small safety belt, with which I can strap down my head to prevent whiplash injury. I keep in mind that I cannot bring new things aboard before first having created a secure place for them. That includes pretty girls. Even though I have endeavoured to make my boat safe, an accident might still happen. I realize that I am not one hundred per cent safe on the ocean waves. But on land I am less safe. By sailing my boat in deep water I am out of reach from the dangers which makes life ashore so hazardous. Contrary to the common opinion, I increase my chances for a long healthy life by going to sea.

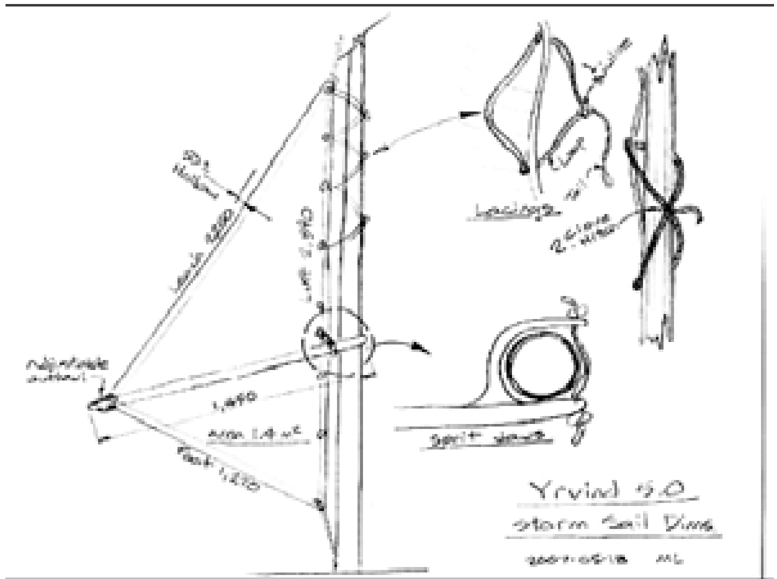


I like to stay at sea for long periods of time. Therefore, *Yrvind* is designed with a large cargo carrying capacity. To keep the radius of gyration small the boat's endships have to be kept light. I will carry most of my stores low down in the middle of the boat in the dry saloon, under the bunk, and in the side lockers. There I have 27 cu.ft of storage volume. *Yrvind* is designed to carry a maximum safe payload of 1650 pounds. My food requirements are less than two pounds a day. Theoretically, this makes it possible for me to stay at sea for 825 days, or two years and three months. For drinking water I plan to use rainwater, of which there is abundance.

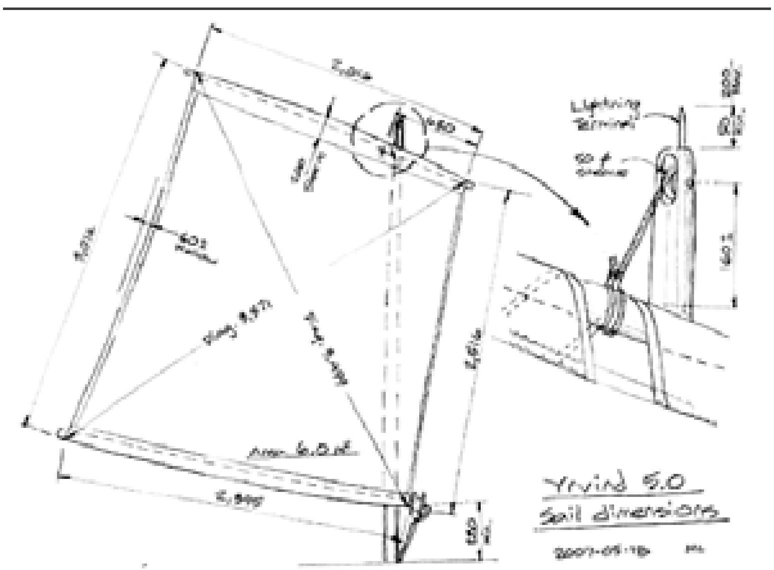
It is true that a bigger boat can sail faster to windward and that weatherliness is very important, especially in gales close to a lee shore. In general, a boat's stability increases with the fourth power of the scale. Accordingly bigger boats are less harmed by strong contrary winds, but stability can be gained by more than just size. In *Yrvind*, I can sleep in the windward bunk and I have arrangements for moving heavy things to windward. In that way I can greatly increase her stability. Because my weight and strength don't increase in proportion to the size of the boat I sail, these actions would not help a bigger boat to the same degree. Another factor, which affects a small boat's weatherliness, is the thickness of the boundary layer between wind and water. This increases with the wind speed so much that during high winds a small boat can live in it and get some protection from the storm. Much also depends on common sense. During my nearly fifty years with small boats I have not even once come to harm due to problems with weatherliness. And I have been exposed. In June 1980, in a nineteen-footer, I rounded Cape Horn from east to west against the prevailing winds and currents. In 1989, I sailed a fifteen-footer from Ireland to Newfoundland, mainly to windward. During that passage my girlfriend and I faced a series of westerly



gales lasting for eleven days. When, on the twelfth day, the sky had cleared enough for me to use my sextant, I found that we were farther west than when the gales had started. Friends of ours in a heavy thirty- five footer never made it. Later we heard that they were telling people that they had to give up because the weather had been too stormy that year. The reason we succeeded where our friends in their big boat failed was that our boat had a short mast rigged with a small trysail. That gave us a good lift-to-drag ratio. With our bow centreboard lowered and very little sail area, we took the waves nearly head-on and slowly worked our way to windward in comfort. Weatherliness, especially when sailing slowly against strong winds and breaking waves, is also very much a question of having a large lateral area. Matt Layden's chine runner configuration, incorporated into *Yrvind*, uses the boat's vertical hull sides as lateral area. These can therefore be very much bigger than if she was an ordinary keelboat. In 1974, I tried to round Cape Horn from east to west in a 20-footer. She had earlier successfully dealt with storms near Iceland and west of Ireland, giving me a lot of confidence in her, but in the Southern Ocean, near Cape Horn, she was capsized, and a week later pitch-poled too. I sailed her back to Sweden and built a 19-footer for another attempt, which was successful. Later, when I had returned to the South Atlantic and was cruising among the Falkland Islands, I discovered that when building her I had been so focused on Cape Horn's deep, stormy waters that I had forgotten about the advantages of a shallow draft. The result was an unbalanced design. Although you would never catch a "Kelper," (as the Falkland Islanders call themselves) admitting the islands are windswept, the fact is that there are no trees there, and during my four month stay, the wind speed reached one hundred knots on three occasions. As a consequence of not having a shallow draft, I had to suffer many times by anchoring in exposed places. That gave me a hard time communicating with the shore in my inflatable. A flat-bottomed boat that could have taken the ground would have made life so much easier.



It was when I lived in a little Japanese fishing village, learning how to use their yuloh, which they call "ro" (and which, by the way, I think is far superior to the Chinese) that I realised that the strong flat bottom they use for their traditional boats would also give the cruising man many advantages. It can take the ground without getting damaged. It gives a lot of initial stability. It gives greater interior floor space, and of course, it gives very shallow draft. Later, back in Sweden, when I was brooding over the topic of draft, I remembered I had gotten two letters from America, one from Dave Bolduc and one from Mickie another friend. Both of them contained drawings of Matt Layden's 14-foot coastal cruiser *Paradox*. Once more I got out the drawings and looked at them. *Paradox* has a strong flat



bottom and a draft of only nine inches. At first look one gets the impression that she cannot go to windward, as it seems that she has no means of preventing leeway. A closer look reveals her chine runners, small two-inch wide horizontal winglets sticking out from the chines for about a third of the boat's length. But was that enough? Intrigued, I phoned Dave. He had sailed with Matt for a winter in the Bahamas and confirmed that they worked very well. He gave me Matt's phone number. I called Matt and he told me that he could sail *Paradox* better to windward than Dave in his slightly bigger centreboard boat, and he invited me over to see for myself. In October 1997, I sailed *Paradox* for a month. In 2003 I returned, and again in 2006 and 2007. Each time I stayed for about a month, sailing and discussing boats with Matt. We continue to exchange ideas once a week over the phone, which is very enlightening, as Matt is always one step ahead of me. I am now convinced that the chine runner concept, created by Matt in 1982, is the greatest innovation for small cruising boats in the last century. The reasons why very few people have realized its advantages are that Matt does not try make his voice heard above the din from the egos in our conservative, self-centred society to promote his idea, and that the principles behind it are complex and subtle, and have been subject to little research or experiment. After a decade studying *Paradox*, and talking to Matt I have come to understand that the boat's leeway-resistance comes from a combination of three sources, the chine runners, the lifting body shaped hull and the large rudder.

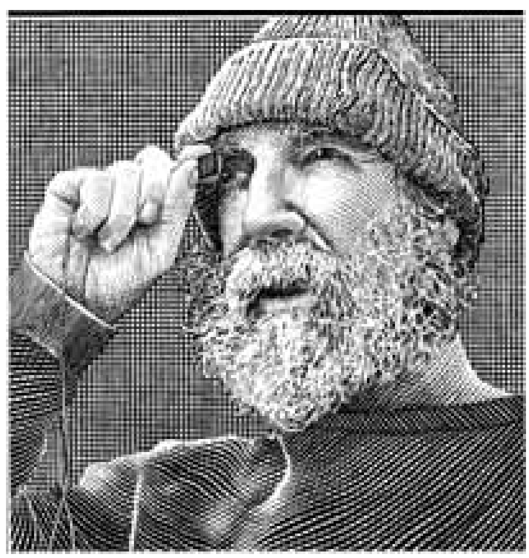
Unlike the ordinary cruising boat, *Paradox* has no heavy ballast keel making her stability obvious. Matt uses less obvious means, like her cruising load kept low and her flat bottom, which, a bit like a multihull, moves a lot of buoyancy to lee at small angles of heel. At large angles of heel, *Paradox*'s righting moment comes from a good height-to-beam ratio and the buoyancy of her superstructure. This shape gives Paradox positive stability at up to 165 degrees of heel – better than most conventional keelboats. Matt uses a lug sail. Until now, my favourite rig has been a wing-mast with a sprit rig having a topsail in light wind and a trysail in strong. Both rigs use short masts and are good. Matt uses a furling/reefing boom. With the help of a line-drum on the forward end of the boom he can reef and furl the sail from the inside. It is an amazingly quick and comfortable way of varying the sail area. That Matt's boats work is evident from his racing results. *Paradox* won the Everglades Challenge in 2003, finishing first overall after 3 days 9 hours and 51 minutes- 16 hours and 6 minutes before the second boat. There were thirty starters.

Yrvind is a cat schooner, with chine runners, a lifting body hull and Matt's reefing/furling lugsails. She has my accommodation plan, movable ballast, Marstrom carbon fibre spars, a forward dagger-board and a large rudder. She is a mongrel, based on Matt's and my ideas. I am grateful to Matt, and would like to thank him here for taking time to engage himself in my problems and doing the drawings and artwork.

Aspects of Yrvind
Bris' Sextant

Sven Yrvind
Translated by Robert Biegler

A sextant is expensive, takes up a lot of space, and needs careful handling. Therefore I wondered whether I could make a simplified sextant to keep in reserve.



A clock that stands still shows the correct time twice a day — but one doesn't know when. A sextant rusted solid shows the correct sun altitude twice a day — and one knows when, namely the moment it shows the sun on the horizon. A navigator needs two sun altitudes to determine position.

If one can make a sextant without moving parts, the problem is vastly simplified. Take away the telescope, and it becomes simpler still. Without telescope or moving parts, the sextant can be made much smaller and can be held closer to the eye. The keyhole effect comes into play, meaning a small but close hole gives a broad field of view. If the sextant is placed close to the eye, the mirrors can be much smaller. That means they are planar, and more exact.

The part of the sextant that requires the greatest precision is the scale. But on a sextant without moving parts, the scale fulfils no function, and can be eliminated. In this way, the instrument is very much simplified.

Still, the navigator needs to know what angle the fixed angle sextant measures. It occurred to me that thousands of times I had compared the observed with the expected sun altitude. If you know your position and note the exact time when the sun, seen through the sextant, touches the horizon, the expected and the observed altitude must necessarily be the same. The procedure determines the instrument's fixed angle. In other words, this is a method for calibrating the instrument.

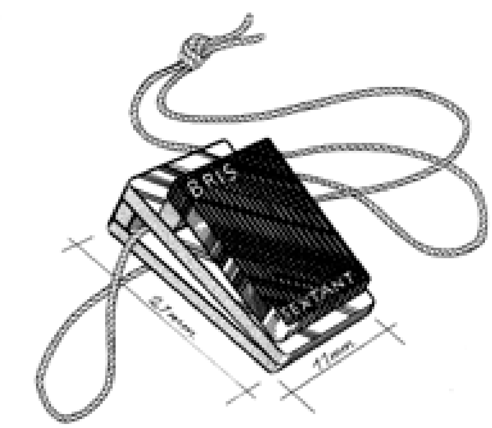
Once I had figured out what I should do, I made a little fixed angle sextant with two bits of mirror, to see whether the whole thing worked. When the sky was clear, I went to a place whose latitude and longitude I knew. I looked through my homemade sextant at the horizon. Through my keyhole-sized sextant I saw the sun slowly sink towards the horizon. When the sun's lower limb just touched the horizon, I checked the time on my watch. First the seconds — they go fastest — then minutes and hours. Then I did the same when the centre of the sun's disc was on the horizon, then the same again for the upper limb. Now I only had to calculate the sextant's angle. When that was done, I calculated, as a control, the angle between the sun's upper and lower limb. The difference is the sun's diameter, which can be found in a nautical almanac. It worked. I had made a simplified sextant.

To measure sun altitudes at different times, I made a set of three sextants. They were so small, that I could hold them all in my hand. Each sextant gave six opportunities for observation, corresponding to the sun's upper limb, centre and lower limb. Each of these touches the horizon in the morning and the afternoon. These are enough observation opportunities per day that I felt well equipped.

Once I determine the angles a Bris sextant measures through the calibration procedure, all instrument errors are eliminated. I don't need to make any corrections for half the sun's diameter, for atmospheric refraction, and so on. That would be like adding a number only to subtract it again. It would be like measuring how high a room is by subtracting the height of the ceiling above sea level from the height of the floor above sea level. The Bris sextant actually simplifies the calculations.

Position, angle and time depend on each other. That makes it possible to calculate, based on the sextant angle at the dead reckoning position, when one should make the observation. That is the fixed angle sextant's tide table. It is not necessary to stand around and wait. Using only an estimated position makes little difference, because the sun's geographic position moves so fast; 900 knots on the equator, corresponding to 15 nautical miles per minute. So one should be ready a few minutes before the time for the observation, to have a good margin.

The Cruiser Club's Ernst Blixt heard of my sextant. Inspired by that, he built his own fixed angle sextant, using glass instead of mirrors. Glass is transparent, but not perfectly so, as everyone knows who has looked at their reflection in a window when it was dark outside. The reflected light is enough to make observations when the sun is bright. Blixt's design improved the sextant in two significant ways. The classical sextant's horizon mirror lets one see half the horizon. Modern sextants often use half



Den nagelstora sextanten. Utan rörliga delar. Enkel, billig och tre gram lätt.

mirrors as horizon mirrors, so that the whole horizon is visible. By using glass instead of mirrors as reflectors, Blixt's horizon mirror automatically became a half mirror. But the best was that besides the double reflection, the instrument also produced a quadruple reflection, giving an extra angle. The two images of the sun differ in brightness. That is because the quadruple reflection has greater reflection losses. That is fine, it makes them distinguishable. The quadruple reflection has exactly twice the angle of the double reflection.

I appreciated Blixt's brilliant idea, but had other things to think about. But a few years later, I had a new idea. The sextant's fundamental principle is to use two mirrors in tandem. I had made a set of three sextants. My ideal is that everything should serve several functions. Bris' rubrail is an example. It protects the hull against abrasion, forms an integrated bulkhead, serves as a step when climbing out of the water, and reduces splashes coming over the side. Another example is the Bris material, which gives strength, insulation and buoyancy.

I thought like this: a sextant has two mirrors, the horizon mirror and the alidade (index) mirror, which give a double reflection. That is its fundamental principle. But when I made my three small sextants, I had put together six mirrors. I asked myself what would happen if, instead of making three sextants with two mirrors each, I made one sextant with six mirrors. Would the six mirrors combine their double and quadruple reflections to produce more images of the sun than just paired mirrors? I tested that with three bits of glass angled relative to each other with two spacers of different thickness and some rubber bands (see figure).

When I tried out my instrument, I saw eight images of the sun, three bright double reflections and five dimmer quadruple reflections. I added another bit of glass and a spacer between the rubber bands. The number of reflections increased drastically. I saw over 20 suns. With five pieces of glass a pearl string of images reaches from the sun to the horizon. I had solved a problem. I enjoyed that.

By assembling several mirrors into a sextant, I had gotten the mirrors to work together to produce many reflections. The three glass sextant gave eight angles. There is a relationship between the images. If the angles between the outside glasses and the middle one are A and B, then the angle between the outside glasses is A±B. Those are the bright images. The five quadruple reflections are 2A, 2B, 2C, A+C, and B+C. Those reflections are less bright.

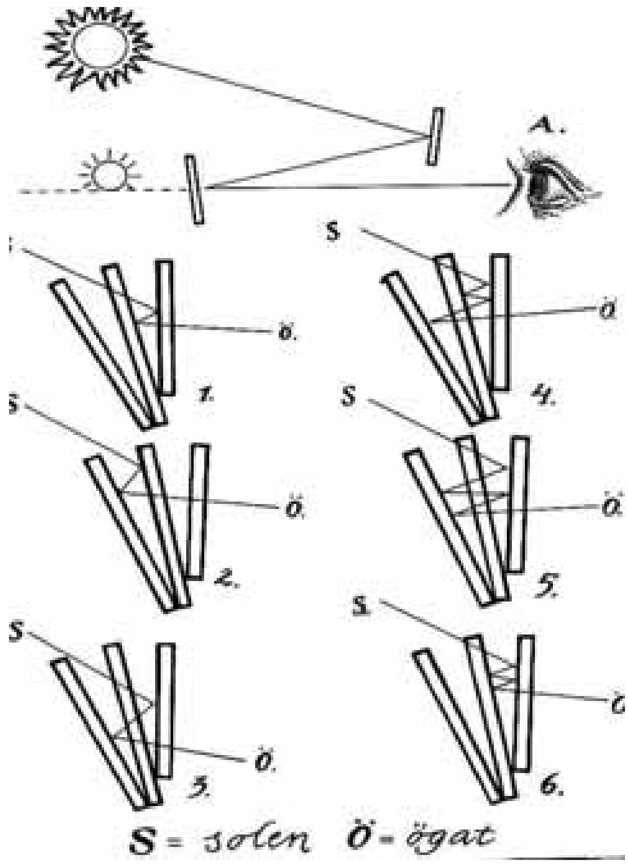
The above is Ben Schuler's formula for three half mirrors. The first to come up with a simple formula for four and five half mirrors, or the more general formula for an arbitrary number of beam splitters as mirrors, which give several double reflections, will get a Bris sextant and a diploma as prize![1]

The standard sextant is an analogue instrument. The Bris sextant is quantised. The standard sextant works like an adjustable spanner; you set it to a suitable angle. The Bris sextant works like a set of spanners; you choose an angle.

To make the instrument independent of temperature, I used spacers made of the same glass as the mirrors. Curt, NM's[2] epoxy chemist formulated an epoxy for gluing the glass pieces together. In the end, I had a small, simple and cheap sextant no bigger than a fingernail that only weighed three gram. I packed it into a film box.

Some landlubbers don't understand that the Bris sextant can be accurate without a telescope. I have made thousands of observations from small boats with good Plath sextants; usually my position lines give a triangle about three miles across. If the weather is very calm and if am lucky I can get them to lie within one mile. In stormy weather I'm satisfied if I can get my position to within ten miles.

When I was rounding the Horn in June in the middle of the winter in my 19 footer from east to



west, 1 could not get better than thirty miles accuracy, but then the weather was rough it was cold and if I remember right the sun did not rise higher than 11 degrees at noon. With the Cape Horn current occasionally running up to four knots, navigation was not easy. ln fact it was my biggest problem.

On the other hand, standing on the beach with my Bris sextant I am often able to get a position line within a tenth of a mile. On rare occasions, I have been able to repeat that three times, one after the other.

Even the best sextants don't have telescopes with higher magnification than three or four times, the reason is even on a big ship it is too difficult to hold the instrument steady. The Bris sextant on the other hand is so light that you can attach it to your glasses. Then the images become dead steady. Also, with both hands free you have one hand for your writing and one for yourself

[1] Translator's note: That is a translation from Sven's book, published in 2003. With him about to set off on a long voyage, he may not be in a position to make good on that offer. Still, that shouldn't stop anyone from offering a solution!

[2] Nils Malmgren AB, Box 2039, 442 02 Ytterby, Sweden. http://www.nilsmalmgren.se

Understanding and development of Aquaplaning Wheeled Sailing Yachts

Kim Fisher

This project was triggered by an article in Popular Mechanics, which I read as a small boy in the 1960's.

My recollection was of a boat/car which was jet powered and sped down a beach on slick tyres and hit the water at such speed that it aquaplaned across the water's surface: a world Water Speed Record contender. I thought it mentioned that it was sponsored by Firestone BUT that the company had withdrawn its sponsorship when they realised the craft was promoting the aquaplaning properties of their tyres!!

I have subsequently found articles referring to a craft, the Green Monster, which was built and driven by Art Arfons. I didn't quite get the wheeled boat description right as the wheels were only used once aquaplaning BUT the idea of an aquaplaning wheeled boat had taken root.

Art Arfons' "Green Monster Cyclops" *(Hot Boat, 1967)*

My core idea was that if a craft was made light enough and the wheels big enough then a landyacht could possibly reach the speed necessary to achieve my aquaplaning goal. In 1971 I went to Colchester Art School to study Industrial Design where I made my first wheeled boat model.

This model had hollow balsa wheels, a solid balsa sail and a 2 wheel axle to the front. It worked well on land but had insufficient buoyancy in water. Polystyrene foam wheels were made but didn't last long when a friend added thinners to the water in the test tank!!!

My design focus moved to model and real landyachts during the next few years BUT the idea of a World Water Speed Record for Sail using this concept wouldn't go away.

After college, jobs and children I started playing with the idea again in 1991 and also came across AYRS.

This 2 foot 6 inches long model had sealed vacuum-formed polystyrene sheet wheels and a spinnaker cloth sail. It was front-wheel steering with backward canted forks. The wheels were 'Smartie' shaped (oblate spheroids). They floated approximately

$^{1}/_{3}$rd deep in the water. It sailed poorly compared with the other yachts on Woodbridge Model Yacht Lake!!

I just wanted to get onto a full size version and sail it.

It was time to try 1:1 modeling

By 2001 I had designed and built GRP wheels and added them to an old, Class 3 landyacht. These wheels had been designed to float the craft + crew with $^{1}/_{3}$rd of the wheel immersed. 3D solid modeling on a computer was used to get the flotation calculation correct: my day job.

The project philosophy from here onwards was to take a landyacht that had worked at up to 60mph on land and then change bits one by one to enable it to **float**, then **steer** and then ultimately to **aquaplane**.

Photos of this first prototype were published in the Amateur Yacht Research Society magazine, Catalyst, in October 2001.

2001 Design insight

The first sail was on the River Deben, Suffolk. The boat was now named REVOLUTION.

During this sail a friend was helming and I was the rescue boat. He sailed over to a mud bank to stop so we could switch over the rudder steering lines to make them activate intuitively. He hit the mud bank, the wheels rolled up the bank and he continued sailing straight along the bank!! It didn't stop and the rudder didn't work on land! We now had an amphibious yacht – more on this later.

2001 Conclusions and the next steps

Towing tests showed that the oblate spheroid wheels sucked themselves further into the water the faster they were pulled.

The difference between pulling REVOLUTION with a boat and driving her with the sails appeared to have slightly different results, which I am still unable to understand. This 'Smartie' wheel shape acted like an inverted aerofoil with very high camber.

The wheels rotated at a speed that appeared equivalent to the wheel traveling the linear surface distance covered.

The 2001 wheels were designed to have strong side ways resistance like large centre plates.

The thin rim web on the wheel cut deep into grass and mud but had very low resistance on gravel and concrete. Video records of these towing tests are available.

The next steps were:

- Source a more powerful sail rig.
- Create a steering mechanism for both onshore and offshore.
- And back to the drawing-board on wheel 'shape' design to improve the aquaplaning properties.

So in 2002:

- A bigger rig from a Dart 18' was purchased - it gave tremendous power
- Rear-wheel steering, as a concept, was built and tested
- New wheel shape design research started

The rear-wheel steering was not a good idea. The moment it was used the lateral resistance physics changed dramatically and the wheels slammed full lock one way or the other. New steering ideas and research was required and it centred on front wheel designs with minimum weight.

It was at this time that I met Tim Glover and others at an AYRS meeting and discussed my wheel design problem. I had already designed a linear water test-tank for model wheel testing but not yet built it.

Tim suggested I build a circular tank which would allow a wheel model to precess around and around giving infinite tank length.

I built one and spent the next 2 years tank-testing many different wheel shape models;. below are the 1st and last wheel models I tested. All the wheels were free to rotate on their axles, driven around only by the action of the passing water. I have hours of video of these tests, great for insomniacs!

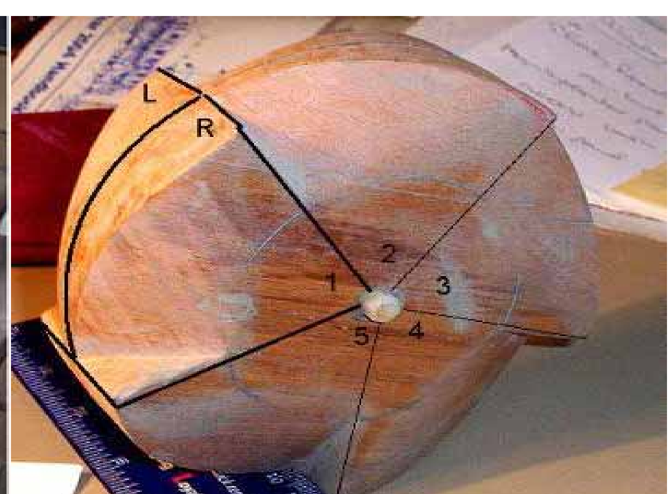
Then came the EUREKA moment! One shape (shown above right) lifted out of the water and skimmed along the surface without a massive build-up in drag. The model wheel was initially stationary (did not rotate) when moving at slow speeds. It then started to rotate as the speed increased. The rotational speed increased in line with increase in linear speed through the water. When the speed was increased further the wheel rotation slowed, stuttered and then stopped. At this point the wheel slowly lifted out of the water as the speed was increased still further.

The wheel had transitioned from displacement, through semi-planing to full planing without a massive increase in drag. A video of this experiment is available. It was repeated several times.

Having discovered this shape in the test tank I set about creating full size wheels to test on my yacht REVOLUTION. The original model, full-size plugs and moulds are shown below.

Before making finished mouldings I tested the completed wheel plug by towing it behind a catamaran (loaned by AYRS member Chris Watson) see below.

Finally, in 2004, I tow tested the completed wheel plug with a 7stone load to simulate its working load as a wheel on REVOLUTION. A video is available showing it gaining speed, revolving, stopping and then, briefly lifting out of the water and planing as per the test tank model. It was brief because the 7stone load was now being supported by an un-reinforced 3mm GRP moulding which failed under



load. It collapsed, rapidly filled with water and exploded as it was being towed at about 7 knots!!

What had been discovered?

A cylindrical wheeled dragged through water, when 1/3rd height immersed, sucks itself down into the water.

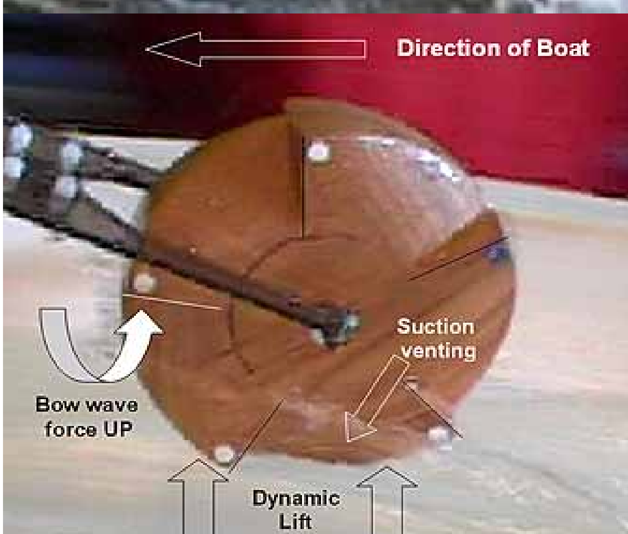
If suction venting shapes are cast into the sides of this wheel shape then the suction created by movement of the immersed part of the wheel through the water can be vented and the downward forces reduced.

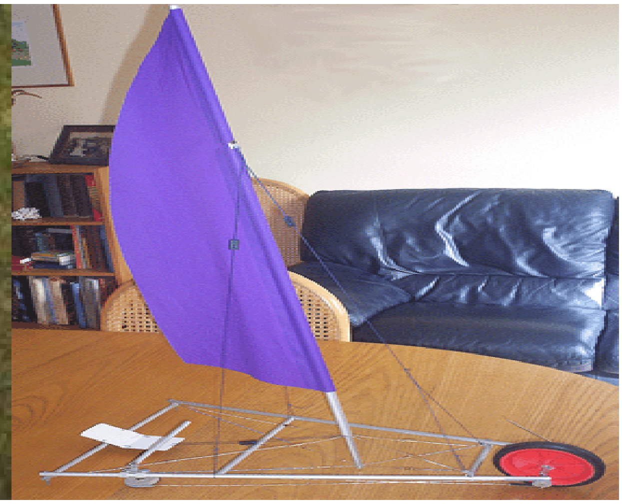
This reduction in suction at the wheel perimeter allows the hydrodynamic lift from the wheel's flat-bottomed perimeter surface to create lift: suction is reduced and dynamic lift takes over causing the wheel to rise and plane across the water's surface.

It was found that a turbulent flow (disrupted) across the wheels outer surface reduced the hydrodynamic suction further BUT did not have a large adverse affect on the dynamic lift.

Also the bow wave from this wheel shape acted upon the venting flat surfaces to stop the wheel rotating when at speeds above 7 knots. This in turn resulted in stabilizing the attitude of the wheel to the water flow such that a planing surface was suitably positioned to give maximum lift. This successful design of wheel had 5 similar surfaces around its perimeter.

When this wheel design encountered a steep wave it would, momentarily stall, then rotate one 'segment' and re-stabilise on the next planing surface.


Direction of Boat
Suction
venting
Bow wave
force UP
Dynamic
Lift



Back to the Original Plan:

The original idea was to create a boat that could break the World Water Speed Record for Sail using wheels on water and to do this by changing a land yacht bit by bit to enable it to **float**, then **steer** and then ultimately to **aquaplane**.

By 2005 I had a wheel moulding that aquaplaned. I then had 3 prototype wheels professionally made from my moulds. These were then tow tested on the original REVOLUTION chassis and axle. They aquaplaned BUT needed a lot of power to drive this heavy craft. Weight had to be designed out of the chassis. I still had no full size steering mechanism, only an idea.

The next phase was to prototype my steering and this also involved a complete chassis re-think. A wire tensioned tubular aluminum frame was designed, modeled and then built. (Models and final builds of the steering and craft are shown above and below.)

This steering design is now subject to a Patent Application. The new tubular aluminum chassis weighs approximately half of the original land yacht chassis. The craft is now 14' wide, 20' LOA, and the Dart 18' mast is 24' tall.

Since the photograph was taken in May 2008 a trampoline has been fitted and a central tiller mechanism built for steering. I now have a craft, nicknamed 'Sloightly on the Huh' (Suffolk phrase) ready to beach/sea trial.

In the last few years the rules governing the Sailing World Water Speed Record have been modified to allow craft to be 'pushed off' from the land. This has helped sailboards, which aren't sufficiently buoyant to lift their crew, to get planing quickly. These changes will enable the wheeled yacht concept to get up to speed by sailing along a beach as a landyacht and then hit the water and plane immediately. To qualify as a World Speed Record the craft must then accelerate to a higher speed once waterborne, not relying solely on momentum for its speed.

Next steps for *this* Wheeled Yacht:

Add 20mm of closed cell foam to the perimeter surfaces of the wheels to act as soft tyres to enable the wheels to run on a beach without being punctured by stones. This foam can also be 'tyre-treaded' to improve suction reduction. The extra buoyancy added will also lift the wheels approx 15mm further out of the water with the current loading and hence improve the displacement to planing performance. The intention is to test run along the sands and into the sea at Old Hunstanton, Norfolk. Third party insurance prior to this test run is another hurdle.

Tim Glover's Newt

Future developments:

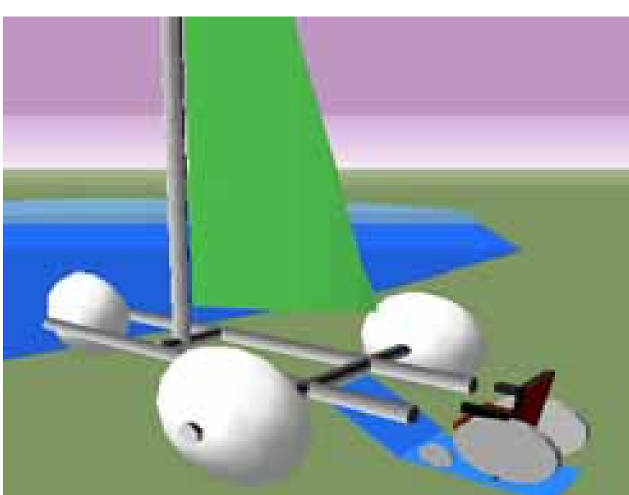
IF the 2008 design wheels perform as expected then the next development for the Speed Record attempt would be to work with Carbon Fibre specialists and a Yacht Design college to perfect this aquaplaning concept and lobby sponsors: to date this project has been wholly funded by me!

Other areas that could exploit this concept are:

Recreational Amphibious Sailing craft – Tim Glover has taken my 2001 Design wheels and has been using them on his NEWT concept – a video of his test rig's very first amphibious outing can be seen at http://www.timglover.me.uk

Sailing Craft for the Disabled – as this concept works on both land and water and is capable of being made very stable (a 'wheel at each corner' and the weight at the corners) I therefore believe it could be designed for a wheelchair person. They would be able to completely rig it themselves and then board the craft on dry land and sail in and out of the water on their own. It would be a first for them, massive independence and might even go quite fast!

And finally: An Inshore Rescue Craft – this could be a 4 wheeled version with a hull for passengers, a big blower on the back like an Air Boat and the aquaplaning wheels for high speed planing and when it gets shallow or sandbanks get in the way.



Protecting Steel from Rust; a simple trial

The Question was posed at a recent AYRS meeting on how to protect mild steel from rust when exposed to seawater. Several suggestions were made, and this is a practical experiment that has been set up to test some of those proposals.

A test raft has been made in the form of a 1 metre long catamaran, each hull being 13cm wide and 14 cm deep and having an overall beam of 53cm. About 25 cm either side of the mid point are two 8mm round bars between the hulls, each suspending six strips of 30 x 3mm mild steel, which have been prepared and coated in various ways. This has been put on a half-tide mooring in Chichester Harbour where it can be inspected periodically during the winter.

The float at recovery time, steel strips raised

Each strip was washed in detergent to remove grease, hand wire-brushed on one side, and the other cleaned with an abrasive disc in an angle grinder to remove loose surface material. This produced a reasonably clean but not bright finish: commercially prepared surfaces are usually bright and shiny using various mechanical means, but I was aiming to recreate lazy backyard techniques.

Both sides were then coated as follows using the methods prescribed on the tins etc.

1) No coating

2) Fertan (an emulsion like coating which reacts with the surface of steel – see www.fertan.co.uk)

3) Fertan plus undercoat and topcoat (old stock in my shed)

4) Zinc rich primer

5) Zinc rich primer + undercoat and topcoat

6) Red Oxide (oil-based from Wickes)

7) Red Oxide + undercoat and topcoat

8) International Metal Primer from the local DIY store (a Cortaulds brand and not apparently the Yachting brand)

9) International Metal primer + undercoat and topcoat

10) Ronseal "No Rust" 2 coats

11) Finnigans Smooth (green)

12) Bitumen, 3 coats

The test kit was launched on the 14th December 2007.

When checked on 2nd January 2008 there was already signs of rust on the Zinc rich primer and to a lesser extent on the Red oxide primer and of course the unprotected strip.

There were also rust streaks on all the strips from the suspension point, wear having removed protection at that point.

About once a month I checked on the condition of the samples and it soon became apparent that all the primers were suffering unless over-coated. After two months there was noticeable deterioration on most strips except for the Finnigans and the over-coated International Metal Primer, although the bitumen and over-coated Fertan were reasonable.

Peeling paint

The best strips

The strips continued to deteriorate, and by June there was noticeable weed growth; so I ended the trial after gently wiping most of the weed off, and brought the kit home to photograph the samples and inspect them more closely.

All the strips had corrosion at their suspension points, abrasion having removed the protective coat, but in most cases this was a local problem. The lower ends which had been dangling in or on mud at low tide, and therefore subject to surface abrasion and diverse chemical attack, showed most deterioration especially at the edges and corners. In some cases the paint was peeling, however the middle zone immersed in seawater when afloat but away from the mud was less affected, and the splash-only zones were least affected.

There was also an obvious benefit from the more aggressive preparation with the angle grinder.

My final choice for the task would be the International Metal Primer, followed by suitable topcoats and preparation with as much enthusiasm as possible. I would expect to have to touch up corners and edges as needed.

I probably should have tried Bitumen over a primer as having read the tin I see it is suggested; and possibly Red Oxide followed by Bitumen would be a cheap system, although a change of mind later would need special coating to stop the Bitumen bleeding through, and of course it is not oil resistant.

The paint on the wooden float deserves mention, as by the end of the trial it was awful. I had used an exterior water-based primer and undercoat followed by gloss paint, and it was far from waterproof. The immersed areas peeled extensively leaving obvious wood grain exposed; the deck and upper topsides were OK except for the mooring attachment area; and a combination of chafe from the bridle and poor protection of the mild steel "chain plate" across the deck allowed major failure. Maybe I should try out various wood primers another time!

Paint damage on the mooring bridle

Peeling paint on the wooden float

The final results

Fred Ball
chairman@ayrs.org

Catalyst Calendar

This is a free listing of events organised by AYRS and others. Please send details of events for possible inclusion by post to Catalyst, BCM AYRS, London WC1N 3XX, UK, or email to **Catalyst@ayrs.org**

November 2008

2nd London Area All-day Meeting
9.30am to 4pm Sunday 2nd November 2007, Thorpe Village Hall, Coldharbour Lane, Thorpe, near Staines & Chertsey. Location map via the AYRS website www.ayrs.org. Details from Fred Ball,
tel: +44 1344 843690; email frederick.ball@tesco.net

26th-30th Sail Power & Watersports Show
Earls Court, London, UK. Rival to the London Boat Show in January (see below)! AYRS will NOT be there unless someone gives us a free stand, but we would welcome feedback from those who go as to whether we should try to be there in 2009. Details from http://www.earlscourtboatshow.com.

December

No AYRS London meeting

January 2009

9th - 18th London International Boat Show
EXCEL Exhibition Centre, London Docklands. AYRS will be there, in the Boulevard (B7N). Helpers are wanted to staff the stand, sell publications and recruit new members. If you would like to help (reward: free ticket!) please contact the Hon Secretary on 01727 862268 or email office@ayrs.org

25th All-Day AYRS Meeting
9.30am-4pm, Thorpe Village Hall, Coldharbour Lane, Thorpe, Surrey (off A320 between Staines and Chertsey – follow signs to Thorpe Park, then to the village). Details from Fred Ball, tel: +44 1344 843690; email frederick.ball@tesco.net

25th AYRS Annual General Meeting
4pm, Thorpe Village Hall, Coldharbour Lane, Thorpe, Surrey (as above). Details from the AYRS Hon. Secretary tel: +44 (1727) 862 268; email: secretary@ayrs.org

Note: Items to be considered by the AGM, including nominations for the Committee MUST be received by the AYRS Secretary before 22nd December 2007 (post to AYRS, BCM AYRS, London WC1N 3XX, UK, or email: secretary@ayrs.org)

March

7th AYRS Southwest UK Area Meeting
2pm 7 Cross Park Road, Wembury, PL9 0E near Plymouth. A short coastal walk (not more than three miles, less if the weather is bad) setting off at 14:30hrs; back by 16:00ish, so if you don't want to come on the walk join us then. After tea we will show slides and talk about boats. Details from John Perry, 01752 863730 j_perry@btinternet.com (note the underscore in that email address).

April

26th Beaulieu Boat Jumble
The National Motor Museum, BEAULIEU, Hampshire, UK. AYRS will be there!

May

2nd – 4th *Broad Horizons* – AYRS Sailing Meeting
Barton Turf Adventure Centre, Norfolk UK, NR12 8AZ. Details on the AYRS Website http://www.ayrs.org. Contact AYRS Secretary AYRS Secretary, BCM AYRS, London WC1N 3XX, UK; email: office@ayrs.org. Note: All boats limited to 1.2 metre max draft!

Date to be fixed
Meeting at the Castle Cove Sailing Club in Portland Harbour, Dorset, UK. We are looking towards the end of May. This is the warm up for Weymouth Speed Week and we will be doing towing trials on the model of Icarus 3 and more testing on the new timing systems. The format is we use the club Monday to Friday during the day and they tend to invite us to use the club in the evening if members don't need it. Tea and coffee with biscuits is on tap all week and we ask for a donation of £30 each for the CCSC. Contact: Robert Downhill, email: icaruswsr@tiscali.co.uk.

23rd-26th UK Home Boat Builders Rally – Norfolk Broads
Barton Turf Adventure Centre, Norfolk UK NR12 8AZ. For details see http://uk.groups.yahoo.com/

How to supply information for publication in Catalyst:

The Best way to send us information:- an electronic (ascii) text tile (*.txt created in Notepad, or Word, with no formatting at all, we format in Catalyst styles). Images (logically named please!) picture files (*.jpg, gif, or *.tif). If you are sending line drawings, then please send them in the format in which they were created, or if scanned as *.tif (NEVER as .jpg because the format blurs all the lines).

Film photos should be scanned at a resolution of at least 300 ppi at the final size and assume most pictures in Catalyst are 150 by 100mm (6 by 4 inches). (Scan slides at 1200dpi.) A digital photograph should be the file that was created by the camera. A file from a mobile phone camera may be useful. Leave them in colour, and save them as example *clear_and_complete_title.jpg* with just a bit of compression. If you are sending a CD, then you can be more generous with the file sizes (less compression), than if emailing, and you can then use *.tif LZW-compressed or uncompressed format.

For complex mathematical expressions send us hardcopy or scan of text with any mathematical characters handwritten (we can typeset them), but add copious notes in a different colour to make sure that we understand. We can also process MS Equation and its derivatives. Include notes or instructions (or anything else you want us to note) in the text file, preferably in angle brackets such as <new heading>, or <greek rho>, or <refers to *image_of_jib_set_badly.jpg*>.

Otherwise: — If you write in longhand, and sketch (in black ink) or include photographic prints, and trust to snail mail (a copy, never the original) then all should be dealt with in due course (if we can read your handwriting - Seriously, clear black typescript, double spaced, is MUCH better!). If you have trouble understanding anything in this section, email to ask.

As examples, the polar diagram p16 of *Catalyst 28* was re-created from a second generation photocopy, photos of shunting in the Champion article in *Catalyst 27* (pp 19-21) were screen grabs from a video supplied on DVD. The rest of the images in that article were scanned from photographs, and the text was OCRed (Optical Character Recognition software) or keyboarded.

Send a copy of your work (copyshops can scan to file and email for you):

by email: catalyst@ayrs.org,
by fax: +44 (8700) 526657, or
by post: Catalyst, BCM AYRS, London, WCIN 3XX

Catalyst — *a person or thing acting as a stimulus in bringing about or hastening a result*

On the Horizon . . .

Split junk sails
Sailboat speed vs wind speed
Flexfloil wind generator
Yuloh theory & practice
Tazmarans
Experimental platforms
More sources and resources: reviews, publications and Internet sites

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