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AYRS, Amateur Yacht Research Society

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Catalyst

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CATALYST is your magazine. This is where the details of your personal projects, your thoughts and opinions may be expressed for the benefit of the membership!

Send correspondence and prospective articles for publication in Catalyst to: editor@ayrs.org - this email address automatically forwards to our 'editorial team'.

These days we would expect material to usually be sent by email but if you need to use the post you could ring our Chairman, 07484668904 for a postal address.

Catalyst

Journal of the Amateur Yacht Research Society

Editors: Robert Biegler
Dr Jasper Graham-Jones
Ben Mull

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Front Cover

Nikki foiling dinghy



Draft Minutes for the 59th Annual General Meeting of the Amateur Yacht Research Society Meeting held Sunday 22 January 2023 at 14:00hrs at the Basingstoke Canal Centre, GU16 6DD and on-line using Zoom

1. Members present

Eight members at the meeting room plus four attending by Zoom. Committee members present were Kim Fisher, Andrew Ford, Niels Daikin, Michael Ellison, Chris Gould, Tim Glover, Mark Hillman, John Perry, Graham Ward, Jasper Graham-Jones,

2. Apologies for Absence

An apology had been received from Norman Phillips

3. Minutes of previous AGM

A vote was held to accept the minutes of previous AGM. Proposed by Kim Fisher, seconded by Niels Daikin. Approved nem con.

4. Officers' reports.

A vote was held to accept the Chairman's and Treasurer's reports, the later including a proposal to change to just two subscription classes these being a £30pa subscription for members requiring the Catalyst journal as posted paper copy and a £10pa subscription for members requiring Catalyst electronically by email attachment. Proposed by Graham Ward, seconded by Niels Daikin. Approved but with one member against on the grounds that it would be simpler to have only a single subscription class for all members.

5. Election of President, Officers, Committee Members, and Reporting Accountant

It was proposed that:

- Marcus Lee be elected Honorary Secretary (Chris Ryan having stood down from this role during 2022)
- Jasper Graham-Jones be re-elected Vice Chairman
- An editorial team of joint Honorary Editors be formed, this initially comprising Jasper Graham-Jones, Robert Biegler and Ben Mullett. (Mike Howard having stood down from this role at this AGM)
- All current ordinary committee members be re-elected
- Niels Daikin and Andrew Ford be elected as new ordinary committee members
- Robin Fautley again be appointed as Reporting Accountant

The above was proposed by Kim Fisher, seconded by Charles Magnan. Approved nem con.

6. Any Other Business

No matters for consideration under Any Other Business had been put forward in writing by any member prior to this meeting so the AGM was concluded at this point.

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Note: Following the meeting there was discussion regarding recruitment of new members. A suggestion was made that any member knowing of a person who might enjoy AYRS membership should let the committee know of that person who would then be offered a first year of membership free of charge.

## **Increase to AYRS Subscriptions after 30 September 2023**

The AYRS committee has decided that the time has come to raise subscription levels, but only for those members who require Catalyst (and any other technical publications we may produce) as paper copy rather than electronically by email. At the same time we have decided to simplify our subscriptions to just two classes – those who require publications on paper and those who require them by email. We will no longer offer different subscription rates for retired members and student members.

### **The new rates applicable from 1<sup>st</sup> October 2023 are:**

- For those requiring publications as paper copy - £30 per annum
- For those requiring publications by email - £10 per annum

Please note these new rates in time for our next financial year commencing 1<sup>st</sup> October 2023 and please update standing orders prior to that date.

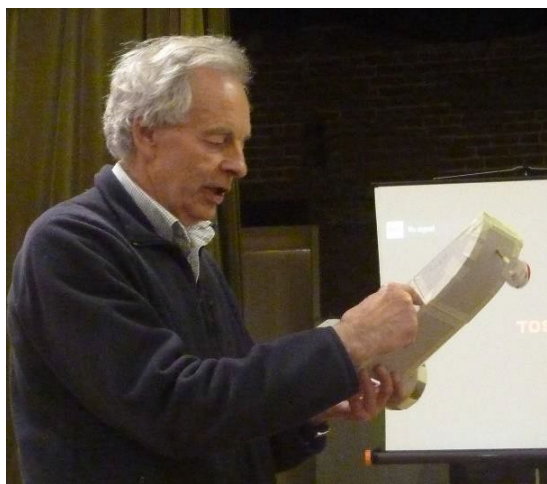
The AYRS has kept subscription levels constant for many years but it has become clear that a £20pa rate for members requiring publications on paper is no longer sustainable due to increases in printing cost and particularly in postage cost. Also, in the past, although we advertised a £20pa rate for members requiring paper publications, we had a number of such members regularly paying both smaller and larger amounts than that. This situation probably came about as a result of members not changing standing orders when subscription rates had previously been changed. At one point in our history we actually reduced our subscription but a number of members kept to the previous higher rate and at least in some cases we know that this was intentional and intended to help the Society financially. We would now like to have all our members paying our advertised rates but we would certainly be grateful to any members who are prepared to help the Society by continuing to pay at a higher rate – our Treasurer will now regard any such over-payment as a donation and it will be included as such in our annual accounts.

Note that we are not proposing any increase to our £10 rate for those who are happy to receive Catalyst as a .pdf email attachment. £10 is sufficient, albeit with very little margin, to cover the various costs that we incur other than printing and postage of Catalyst. Such costs include public liability insurance, hire of meeting rooms, website hosting, a subscription to Zoom and a donation to support Weymouth Speedweek. We hope that offering a low rate to members not requiring Catalyst on paper will make membership attractive to the younger generation many of whom have no wish to read from paper.

The new subscription levels were agreed by the AYRS committee at an on-line meeting held on 18<sup>th</sup> January 2023. Our Articles of Association do not require a change of subscriptions to be agreed at a General Meeting but we did hold a vote of approval for the change at our AGM held on 22<sup>nd</sup> January 2023 and this was passed with only one member against.

# Obituaries

## Slade Penoyre



*Slade delivers a presentation at an AYRS meeting at Thorpe village hall.*

Slade Penoyre, a longstanding member of the AYRS, passed away on 1<sup>st</sup> May last year aged 83. Slade had been suffering dementia and had moved to Hereford where he was cared for by his sister Mary.

Slade pursued, with great enthusiasm, a large number and variety of boating projects, I mention a few of them below. Slade's motivation behind all his projects was altruistic – to 'save the planet' (as he would put it) by producing renewable energy, to encourage more women to participate in boating by designing features that he felt would improve comfort on board and to make boating more financially accessible by designing modifications to make small open boats suitable for cruising.

My first contact with Slade was as a fellow member of the Dinghy Cruising Association. Slade had the idea, which was quite novel at the time, of using an off the beach style catamaran for fairly long distance cruising. Slade and a companion had already made a cruise along much of the UK south coast with a Prout 'Shearwater' catamaran and I was now invited to crew with him on his first trip across the Solent with a Prindle catamaran that he had recently used to participate in a race around Texel island. When I first saw the catamaran, I was astonished to see that Slade had fitted a huge plywood box in front of the mast to carry our luggage. We did manage to drift across the Solent, set up small tents on the foreshore near Wooton creek, then drift back the following day. Then some years later Slade invited me to his house at Windlesham to see his latest beach cat cruising modification, this time an approximately cubic demountable cabin with full standing headroom that entirely covered the trampoline space on a 16 foot 'Catapult', a cartoppable catamaran with inflatable hulls. Then more recently a smaller version of this appeared on a miniscule 8 foot long catamaran that had been built by Fred Ball – Slade was always keen to collaborate with other AYRS members to enhance their projects!

I recall a number of discussions between Slade, myself and other AYRS members as to how we could sail faster, such discussions often took place late in the evenings of Weymouth Speedweek as well as at AYRS meetings held in Thorpe village hall. Slade's approach was always more sail area and hence more thrust (and more fun – Slade would often say that we need to make sailing more fun!) My own, more timid, approach was drag reduction. So, when I advocated lifting hydrofoils to eliminate hull drag Slade would counter with ideas for kites which in theory allow almost unlimited sail area and/or paravanes (Hapas) towed from a point high on a rig which would in theory also allow unlimited sail area. During those Speedweeks Slade and Fred Ball both assisted AYRS member Roger Glencross to further Roger's ambition to achieve 'ultimate sailing', that being a mode of sailing whereby the force from a kite is balanced by the force from a paravane with the crew suspended in the air between these two devices (as now being developed by the Syroco team - <https://syro.co/en/speed-record/>). These experiments required on-shore work with bamboo poles, aluminium tubes and duct tape to assemble the kites and paravanes followed by a lot of messing about on the water and often ending with a soggy mess of wet kite and tangled kite strings.

I made a couple of paravanes for Slade and we tested these at a memorable AYRS meeting held on the river Orwell in Suffolk – I will never forget crewing on Slade’s inflatable catamaran at scary speed (although in reality it was probably less than 10 knots) while towing a large paravane on a line from halfway up the mast – what could possibly go wrong! Tacking was certainly one problem.

Another thing Slade tried with the ‘Catapult’ inflatable catamaran was increasing righting moment simply by extending crew weight further out to windward. He came up with a system he termed ‘AYRSslide’ which was a sort of canvas sling between two poles extended from the windward hull of a catamaran and on which crew would sit or lie – a forerunner to the sitting out seats seen on some modern beach catamarans. Taking the idea further culminated in setting up a heavy wooden extension ladder (maybe 20 foot if fully extended) swung out from the windward hull of the little Catapult catamaran. Slade was always keen that his projects would publicise the AYRS so to get publicity shots he persuaded Fiona Sinclair, one of our very few lady members, to demonstrate, which she bravely did, albeit on shore, I am not sure the ladder contraption was ever tried afloat.

Slade did recognise that his efforts to increase sail area could lead to a multihull capsize and countered this with proposals to right a capsized multihull at sea which he termed AYRSright – if you use AYRSslide then you may well also need AYRSright, right? At one Weymouth Speedweek, AYRS member Harvey Bowden achieved 23 knots with his ‘Firebird’ catamaran. At that Speedweek Slade persuaded Harvey to try capsizing and then righting this catamaran by use of tackles on the main shrouds and an inflatable float raised to the masthead. Unfortunately one of the tackles was released at the wrong moment and this resulted in breaking the expensive carbon fibre mast. However, Harvey was not deterred and went on to make this a practical system, at least for fairly benign conditions – there is a video here: <https://www.youtube.com/watch?v=655COFngiQA>

As for encouraging more women to go sailing, Slade felt that a typical ‘gin palace’ style motor yacht design offered better comfort on board than a typical sailing yacht and so would better suit female sailors. He had a vision for an unballasted and de-engined motor yacht hull that would be pulled across Atlantic ocean by a huge kite. One might think that such ideas must come from someone who has never made an ocean voyage, but Slade did have considerable experience of long distance sailing. Indeed, Slade took Ann offshore cruising on a small Westerly monohull for their honeymoon (she rarely if ever set foot in a boat after that). Slade was also involved in short-handed ocean racing, the following paragraph is based on a few recollections I heard from Slade himself together with some internet searching, I would be grateful if anyone can correct or add to this.

Slade commissioned Derek Kelsall and Tony Smith to design and build the 55 foot foam sandwich ‘Atlantic’ proa ‘Lillian’ with a view to entering the 1976 Single Handed Transatlantic Race (OSTAR). However, in the winter of 1975 Slade and a companion, Patrick o’ Donovan, capsized this proa 100+ miles off Lands End. After a harrowing time in a life raft, at grave risk of hypothermia, they were lucky to be rescued by a French trawler. The boat was found by a Russian cargo ship which craned it on deck and took it away to Russia – nothing was heard of it after that. At the time Slade also owned a 31 foot trimaran ‘Simaril’ which he lent to Patrick O’Donovan for the 1976 OSTAR. Patrick was dismayed during this very tough race that claimed the lives of two competitors but he made it to the US under jury rig. Slade then lost the boat while attempting to return it to the UK. In 1981 Slade and Tony Bloefield successfully completed the Two Handed Observer Transatlantic Race with Slade’s 26 foot Telstar trimaran, the smallest multihull and the second smallest boat out of the 103 boats that came to the start line. In later years Slade crewed for friends on at least one monohull transatlantic cruise, so Slade was certainly an experienced offshore sailor although I only knew him through his experiments with small craft, kites and paravanes.





*Proa 'Lillian'*

Coming back to Slade's desire to reduce the gender inequality in sailing, Slade considered, probably correctly, that the lack of toilet facilities was a major reason that most dinghy cruising is done by solo males. Slade's solution was simple and inexpensive – a plastic bucket together with a wooden plank into which he had cut a circular hole and which fitted between opposite cockpit seats - as far as Slade was concerned that was the complete solution to getting a more even gender balance in sailing. I remember him proudly showing us the arrangement when I sailed on Slade's final boat, a 22 foot 'Astus' trimaran that he co-owned with AYRS member Mark Tingley. The only lady present on that occasion politely declined Slade's invitation to give it a test run.

As for 'saving the planet', perhaps Slade's most ambitious amateur project was floating wind turbines. Slade's professional background was in the motor industry and his thought was that the cost of wind power could be greatly reduced if the size of wind turbines could be reduced so that they could be cheaply mass produced in numbers typical of the motor industry. His vision was ultimately for a production rate of 2 million wind turbines per year, each with a nominal output of 15kW, these to be mounted on rafts about 12m square which would be moored in shallow seas, this was some years before the big wind power companies started to experiment with floating wind turbines. Slade considered that to promote this concept he would first need to demonstrate that such rafts could survive bad weather and to this end he designed and had built two rafts with commercially available wind turbines mounted on them.

The first of these rafts, termed 'Atlantic 1', was a small scale prototype 3m x 2m, it carried a 2.5m diameter wind turbine with nominal rating 0.6kW and was a catamaran configuration with tubular hulls. In 2007 this was moored off Atlantic College, a sixth form international boarding school on the north side of the Bristol channel. This was an exposed location and when the wind got up above about force 6 the raft capsized, there were also problems with the reliability of the wind turbine. Slade then had Atlantic 2 constructed with a larger wind turbine and a trimaran configuration with beam increased to 3m and welded steel construction. This was moored off Calshot in Southampton water, it did survive in this relatively sheltered location and the plan was to return to Atlantic College for testing over the winter of 2008/9 but I don't think that happened. Meanwhile Slade attempted to interest government agencies in the concept, but without success. Slade was just ahead of time, as uk government recently agreed funding Swedish company Hexicon plans to install its TwinHub system,

the first in the world floating wind turbine off Hayle, Cornwall with the hope it could begin operating in 2025. I suggested to Slade that he should get some realistic cost analysis done to compare the cost of his scheme with alternatives. Perhaps other people made similar suggestions but Slade was reluctant – Slade’s approach to engineering problems was always a practical route – to build something then test it – if necessary to destruction, then build an improved version. Slade showed rather less interest in engineering theory or in instrumentation and data analysis. This actually fits in well with his professional life – Slade was a scientific civil servant working at the Transport and Road Research Laboratory (TRRL) at Crowthorne in Surrey (now known as the Transport Research Laboratory) where he was much involved in crash testing motor cars. I was once in some hotel and switched on the television to see, purely by chance, Slade being interviewed as a representative of the TRRL. I thought Slade came across well, giving excellent answers to interviewers questions about why TRL was spending taxpayer’s money wrecking perfectly good cars and it was clear from this interview that Slade was passionate about his professional work and about saving lives in car crashes, just as he was passionate about making sailing faster and more affordable and especially, more fun.

## Tom Speer



Tom was a long standing AYRS member who passed away on 8<sup>th</sup> November last year but since he lived in the US I don’t think he ever had the chance to attend an AYRS event so I never met him and probably few other AYRS members met him. So I don’t feel able to write about him but instead I offer below links to a couple of writings I have found on the internet. If anyone would like to write further about Tom please do contact [editor@ayrs.org](mailto:editor@ayrs.org).

This link is to a post to the internet forum ‘Sailing Anarchy’:  
<https://forums.sailinganarchy.com/threads/tom-speer-passes-away-the-flow-has-separated.239860/>

And this is an obituary originally published in a US newspaper ‘The Gazette’:  
<https://www.legacy.com/us/obituaries/thegazette/name/thomas-speer-obituary?id=44354931>

Also, Tom’s personal website is still available on the internet – see: <http://www.tspeer.com/> This website provides a lot of useful information about aero and hydro-dynamics – it is clear that Tom was keen to spread his knowledge, at least within the confidentiality restraints that would apply to his work for America’s Cup teams.

From the above writings you see that Tom was a brilliant engineer and a keen sailor who influenced sailing technology at the highest level – the America’s Cup. The 33<sup>rd</sup> America’s cup was one of the few ‘Deed of Gift’ America’s Cup contests meaning that there was little restriction on the design of the competing craft. The Swiss team fielded a 90 foot catamaran with a bowsprit extending that to 120 feet, the US fielded a trimaran of similar dimensions. The real difference was that the Swiss had a conventional fabric rig whereas the US trimaran featured a two element wing sail with major design input from Tom Speer. Despite tactical blunders by the US team, the wing sail boat simply walked away from the conventionally rigged boat, the competition being all over after the minimum two races. Presumably wing sails would be far more widespread if it were not for the very real problem such rigs pose when the boat is not actually sailing. The current AC75 class yachts are an approach to this problem with their ‘soft’ furlable wing sails and at a smaller scale we have AYRS members who have been, or are, experimenting with ideas to solve this problem.

# Balanced Foils, Part 1

Dr. Ian Ward

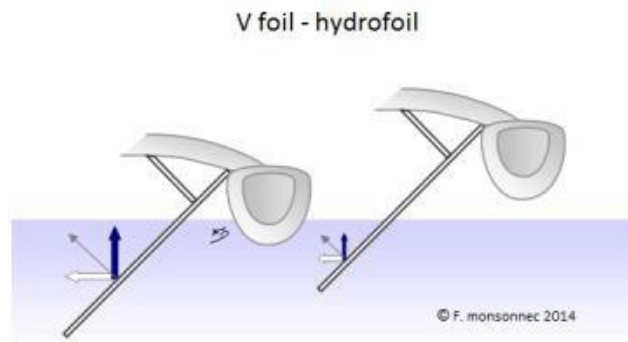
Sydney, Australia

## Introduction

This article is part 1 of 4.

Hydrofoils may be passive or actively controlled. Passive foils are conceptually very simple, they can lift boats, resist leeway, resist rolling and heel while controlling the flying height with no moving parts, controls, or human intervention. They are used on a wide variety of craft from powered commercial ferries to Olympic catamarans, but they can have significant limitations in control, performance, and construction.

### *Passive surface piercing foils*



The latest versions on both catamarans and yachts are improvements but still suffer breaching and control issues in difficult conditions.

### Passive surface running foil

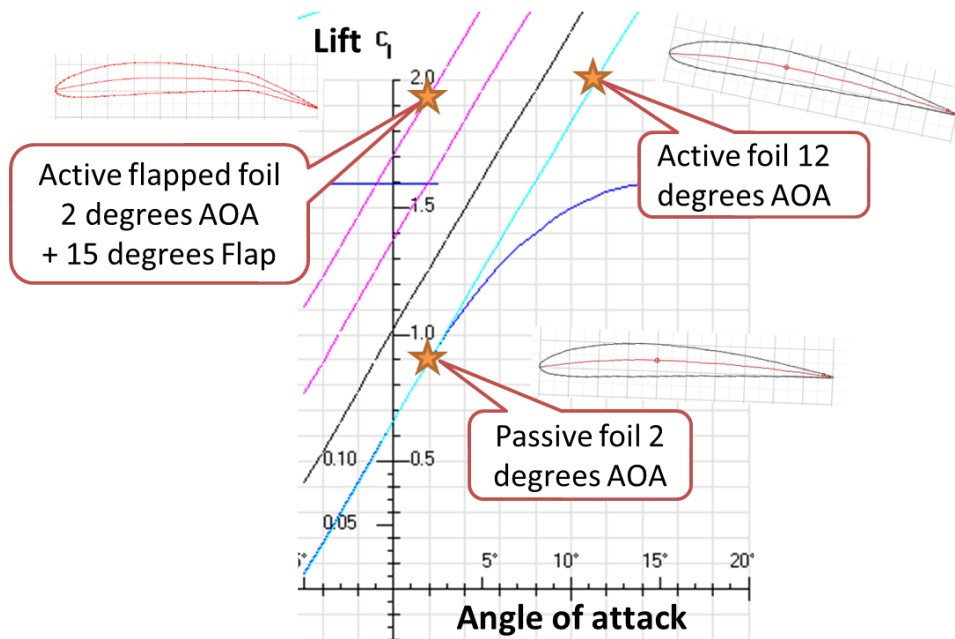
Most passive foils are surface piercing, but some are also surface running for safer height control.



### Active foils

Actively controlled foils, whether flapped or articulated can provide a much higher degree of ride height control and efficiency as they can produce significantly more lift with less surface area. However, they often also introduce more complexity. It is no accident that the most efficient foiling craft including AC50, AC75, Trifoiler, Hydroptere & Moth all have actively controlled foils.

Active foils can generate around  
double the lift of passive foils



Comparing passive and active NACA 5412 foils

*Lift coefficient of actively controlled flapped and articulated foils compared with passive foils.*

### *Flapped foils*

Active foils may be actuated by moving a flap on the trailing edge as with Moths and AC75. The flap works very well due to the small loads but has its own limitations which are described below.



*Moth and AC75 are particularly efficient, using flapped foils*

### *Active moving foil*

Another method to actively control the angle of attack is moving the entire foil as with GP50 catamaran and Trifoiler. This is more complex and requires moving both the vertical and horizontal foils, requiring much larger forces and power.



*GP 50 catamaran and Hobie Trifoiler move entire foil.*

### *Balanced foils*

An alternative method is to utilize a fully articulated “balanced foil”, as with Skeeta and Nikki dinghies. Actively controlled balanced foils provide significant benefits which are not hitherto widely reported or understood.



*Nikki and Skeeta foiling dinghies use an active balanced foil system*

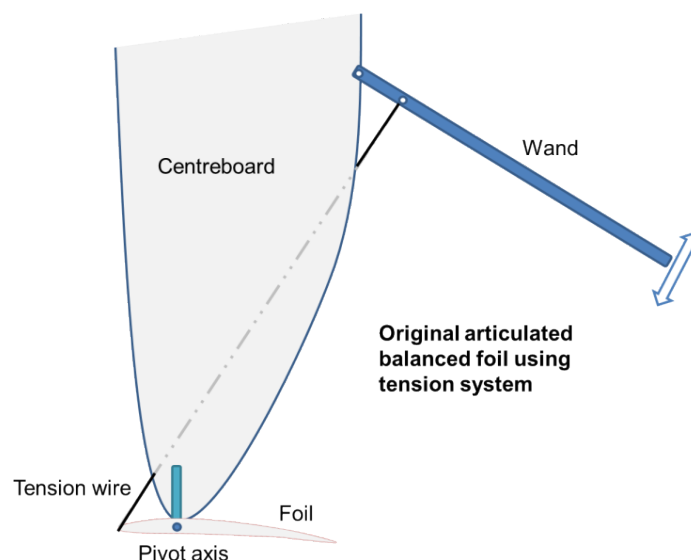
## History of balanced foils

Articulated balanced foil was co-incidentally used on the first centreline foiling International Moth in 1999. The foil itself was relatively small, being only 650mm wide, fashioned from timber, with a stainless steel axle and welded tang, glassed into a trench in the foil. The tang was then bolted into centre board.

Rather than a pushrod, it had a pull wire, which went through the foil and attached to wand on back of foil, making it a very simple integral unit.



While the system worked at lifting boats free from water surface, it had quite poor height control and it was not until several years later when Jim French added a sufficiently robust bow wand on his foiling scow that proper control was achieved with this system.



## Balanced foils proven on a wide range of sailing craft

This fully articulated balanced foil system has already been used over past 20 years on a wide range of dinghies and sailing craft, illustrated below.



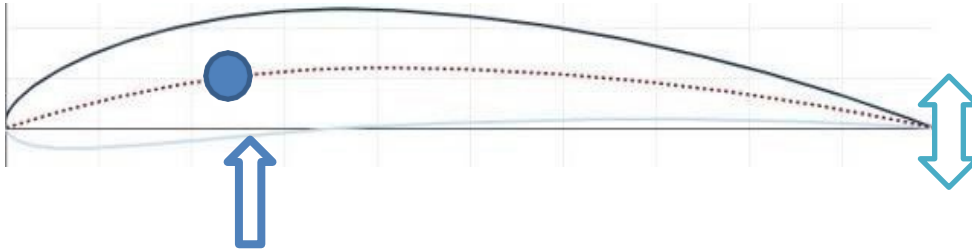


*Altogether, some 600 boats have already been produced using this system*

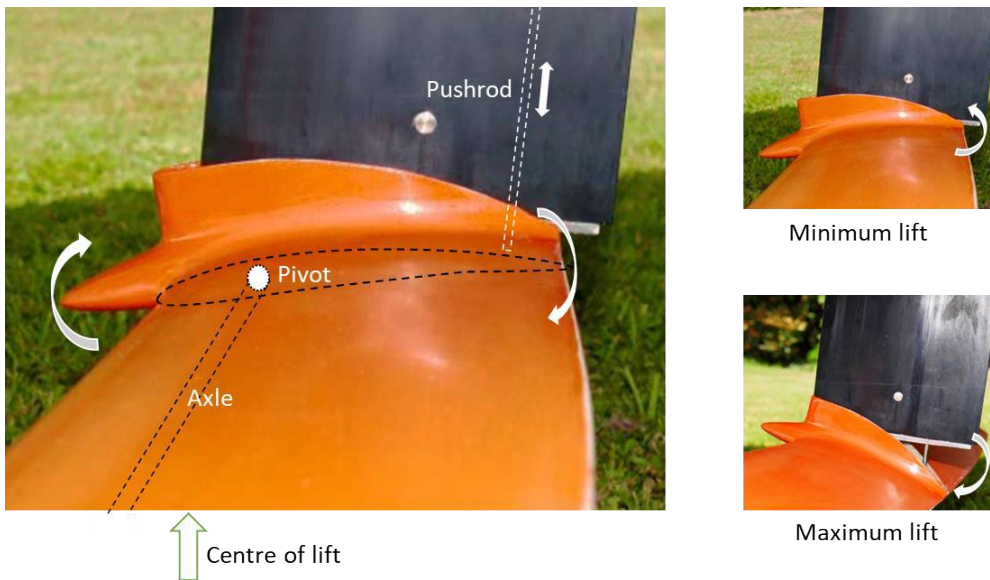


## How balanced foils work

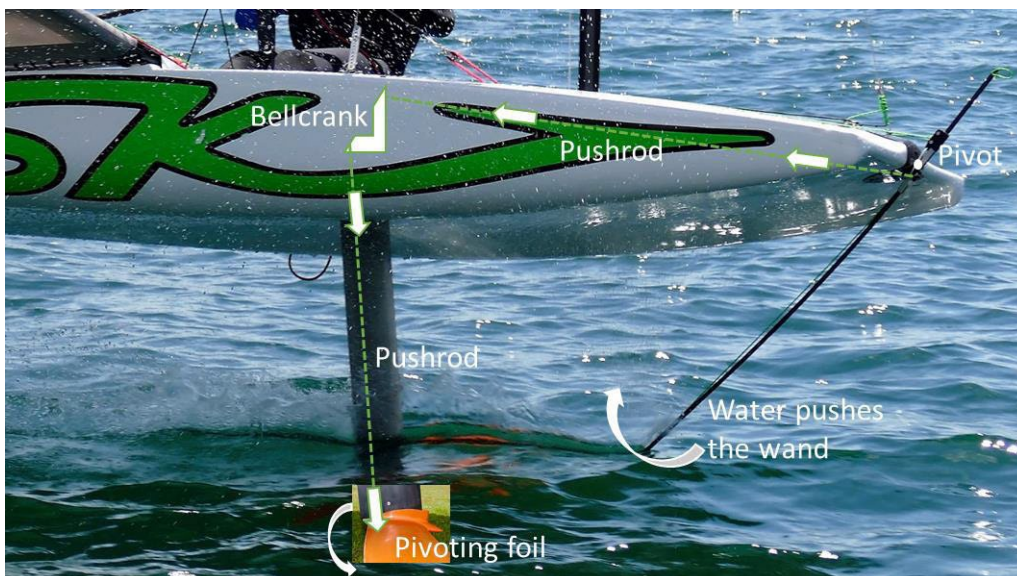
The entire horizontal lifting foil pivots freely on its axle, balancing close to the centre of lift, so the angle of attack can be altered with minimal load.



A pushrod, applies a load to the foil, altering its angle of attack. The lifting force acts slightly aft of the axle pivot, keeping the pushrod in compression. The foil rotation could alternatively be controlled by a tension cord pulling the front upwards.



The pushrod is actuated by a wand which senses water level. As a result, the lift on the foil is adjusted automatically to control the ride height of the boat. Other types of actuators could also be used.



### Benefits of balanced foils

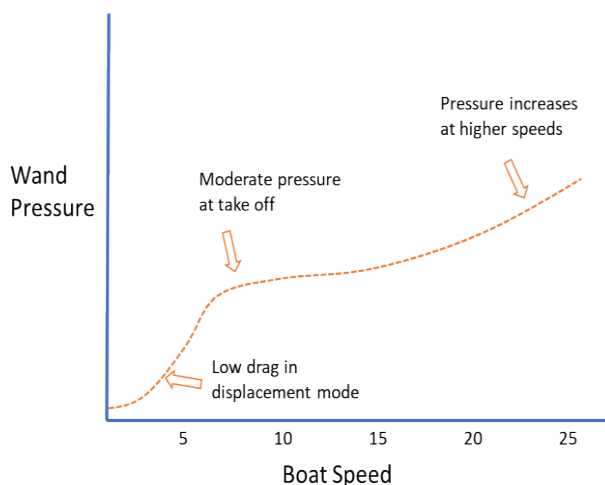
Some of the key benefits of a freely rotating balanced foil system are:

#### a) *Direct response*

The entire height control system is in compression at all times. As there is no push-pull control required, there is no slack in any linkages, giving direct response and positive control.

#### b) *Wand feedback pressure*

In displacement mode, pressure on wand is very light, as there is little load on foil. This allows wand to easily provide full lift on foil without digging wand into water surface. As boat speed increases and lift from foil increases, pressure on wand also naturally increases as foil takes full weight of boat.



Once foiling, feedback force on wand depends on boat and skipper's weight. At higher speeds, centre of pressure on cambered foil moves aft, further loading wand, keeping it in close contact with water surface at all times. There is normally no need for a bungee or shock cord to push wand down, as there is always an appropriate opposing force applied automatically by foil control system throughout entire speed range.

#### c) *Smooth Control*

The arrangement of wand mechanics and geometry automatically smooths ride height control, without any need for adjustment or intervention while sailing.

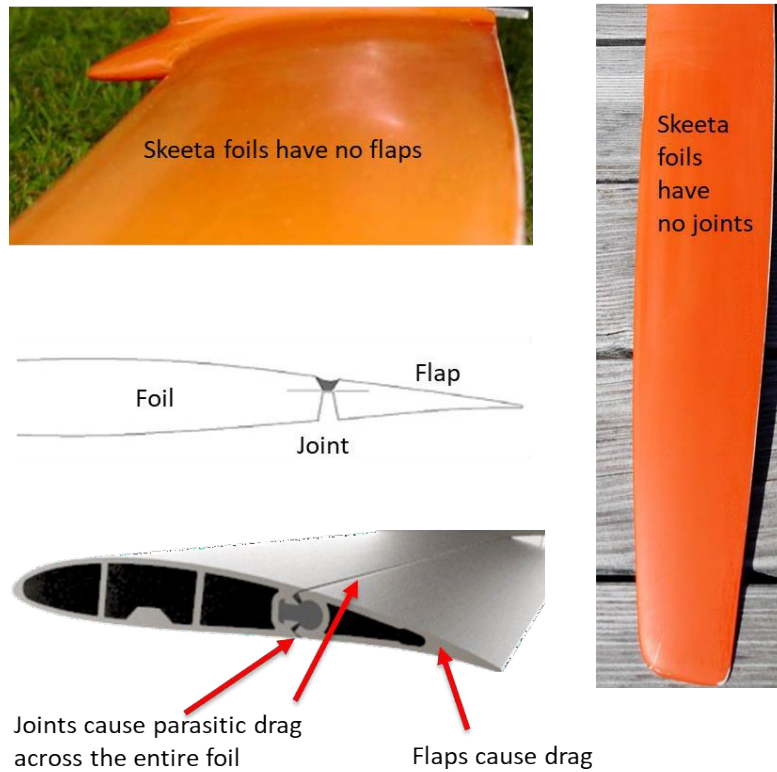
The reaction frequency of wand is naturally reduced as it is raised due to increased length, weight and inertia of wand above its pivot at bow.

Also, as ride height is increased by lowering wand, the gain of entire system increases, further smoothing reaction to waves, pitching and automatically producing a smooth and accurate ride.

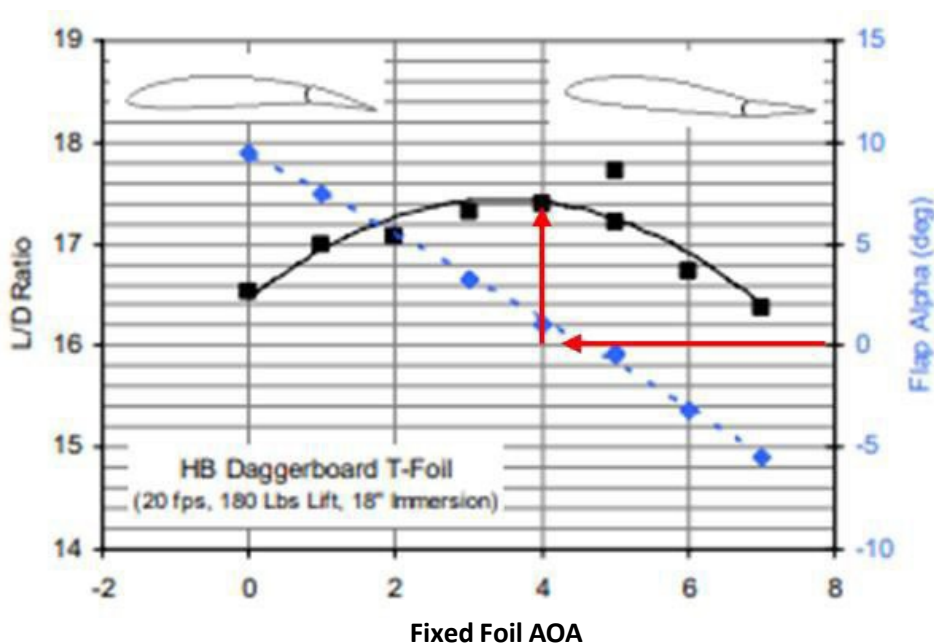
d) *Reduced drag*

As the entire foil pivots freely on its axle, there is no flap to increase drag, nor a hinge joint across foil to cause parasitic drag.

Lowest foil drag is when there is no flap and no joint.



A flap induces drag, which is less efficient than a fully articulated foil, as shown by Beaver et al in tank test experiments with full sized Moth foils. For the same lift, maximum foil efficiency, i.e. L/D ratio, is achieved when flap is at zero degrees deflection. At takeoff, with flap at +9 degrees, L/D is some 11% less efficient (higher drag) than for a flapless foil carrying the same load.



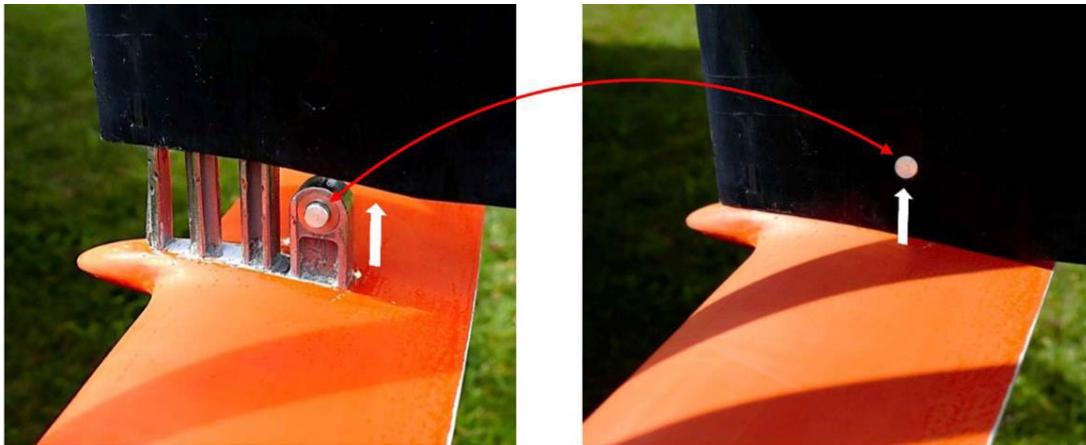
In addition to foil efficiency, presence of flap joints across full width of foils produces parasitic drag, which does not exist within fully articulated foil, a further benefit not shown in test results above.

e) *Structural strength and aspect ratio*

With no flaps, the entire foil is structurally stronger, making it possible to achieve a higher aspect ratio and to use smaller foils.

f) *Clip-on foils*

As pushrods are not fixed to horizontal foils, this makes it easy to attach foils to a vertical section. Clip-on foils are possible, so vertical foil can be inserted from above which is much more practical for rigging, launching and retrieval. Thus, overcoming one of the major practical limitations of foiling craft.



The vertical foils are inserted from above.

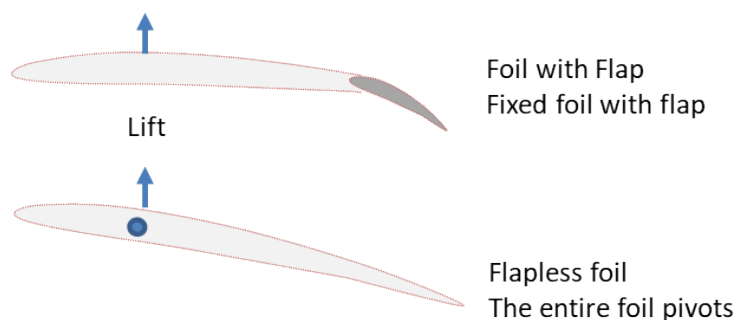
The horizontal foil is clipped on from underneath

There is no need to tip the boat over when rigging, launching or retrieving.

Easy to rig, store and transport

g) *Simpler Control*

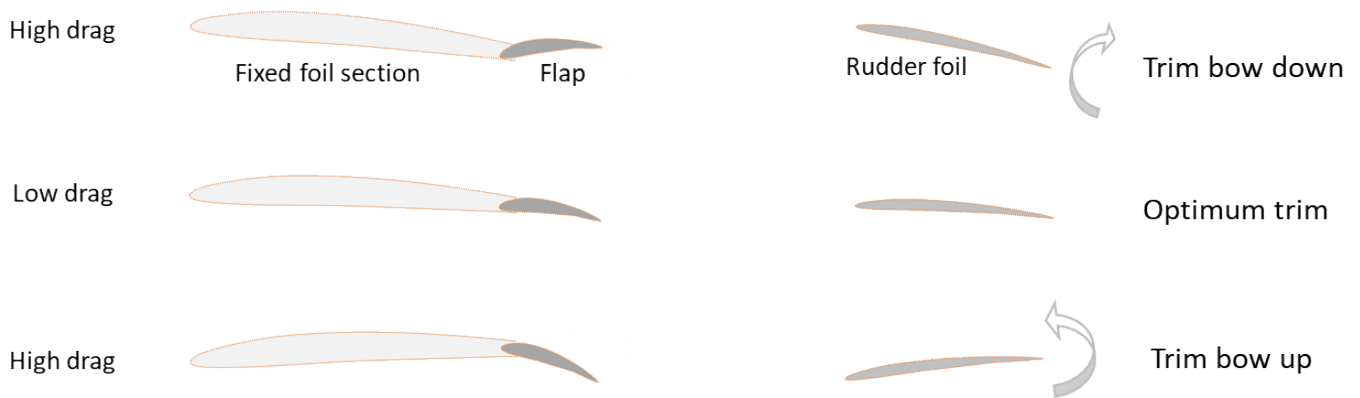
As entire foil pivots to control lift, there is no need to alter rudder trim to align fixed foil section with flap. So, operation of the system is much simpler and more automatic as the foil is always operating at its lowest drag configuration.



As boat speed increases, the wand adjusts entire main foil to optimum position. As there is no need to manually adjust for lift of a fixed foil section, there is no need to trim rudder when travelling at high speed to keep the boat in water. This entire control process is simplified and automatically produces optimum performance over full range of operations.

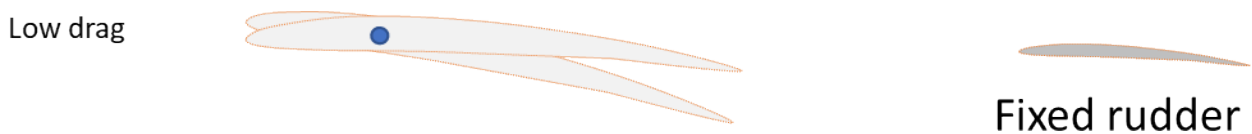
**Comparison with flapped foils**

As boat speed changes lift generated by fixed foil section on conventional flapped foils alters. The flap angle then changes to compensate, resulting in increased drag. The rudder foil is manually adjusted to trim boat to optimise flap angle and reduce this drag.



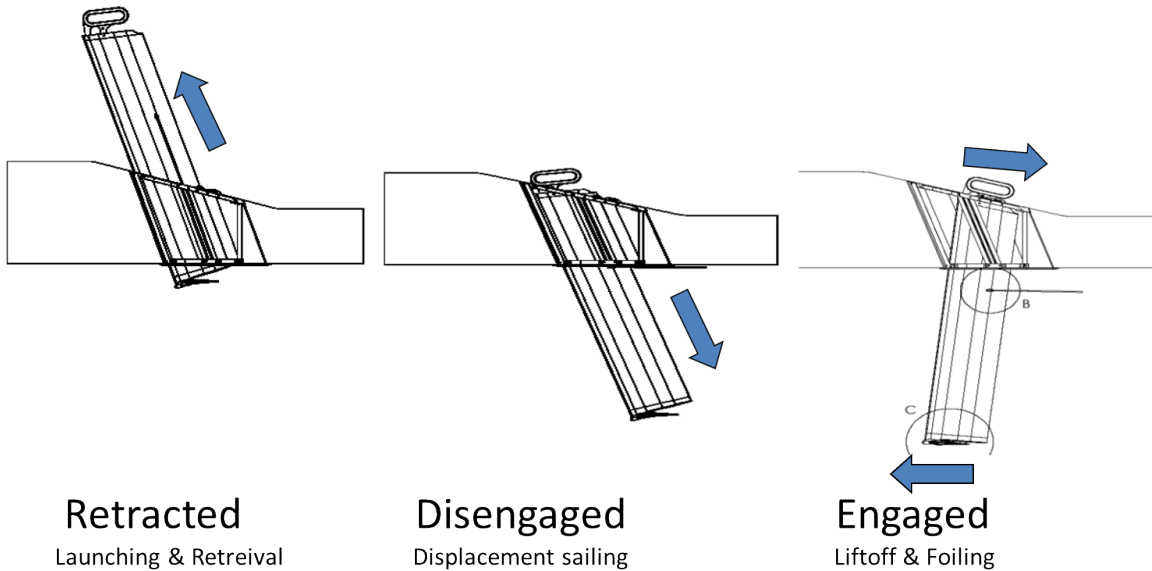
**Balanced foils**

Balanced, flapless foils are always automatically optimised for lowest drag. As there is no flap, there is no need to trim the rudder, so no twist grip tiller extension is required.



**h) Disengage the foil.**

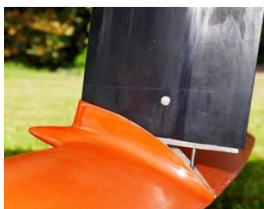
The entire vertical foil can also be rotated fore and aft within the centre case, allowing the foil to be easily engaged or disengaged for low drag displacement sailing. An over centre loading of foil can allow the foil to disengage automatically if it hits anything in the water.



**i) Recovery from breaching**

If boat breaches water surface, the entire foils acts to arrest fall, making crashes less aggressive, were boat recovers more easily.

Flying too high can result in breaching which can cause severe crashes



Skeeta foils present the entire foil surface to produce lift  
Recovery is much faster, reducing the risk for severe crashes

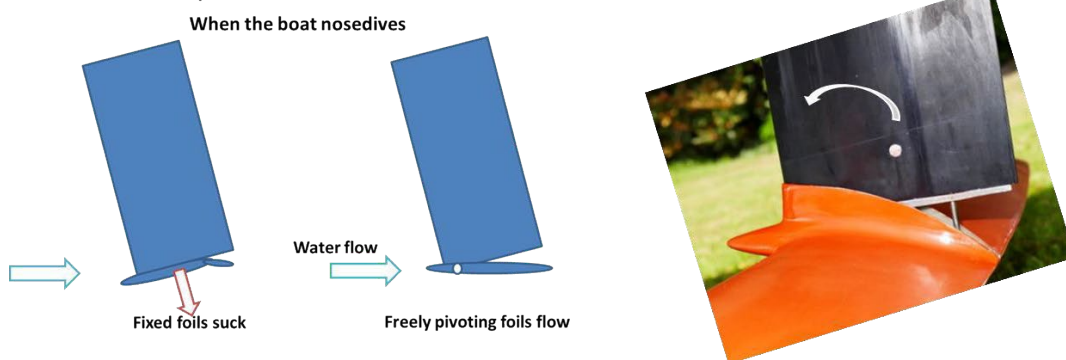


j) *No tripping in crashes*

If a boat crashes, the foil rotates freely and does not trip the boat up, reducing severity of crash.



Crashes can cause the fixed section of foils to produce negative lift, causing the boat to trip, which can result in severe nosedives and cartwheels



Fully articulated foils to pivot freely, reducing the risk for tripping, nosediving and cartwheels

k) As entire system is much simpler than either flapped or fully moving foils, it is cheaper to produce, install and certainly much easier to operate. In dinghies, only one control line to adjust ride height. Everything else is automatic and there is no need for a twist grip rudder control etc.

System simplicity

The foil and rigging system greatly reduces the complexity and controls required



**Skeeta**

- 1) Mainsheet
- 2) Vang
- 3) Ride height
- 4) Outhaul
- 5) Tiller

**International Moth**

- 1) Mainsheet
- 2) Vang
- 3) Outhaul
- 4) Downhaul
- 5) Ride height
- 6) Gain
- 7) Pushrod length
- 8) Rudder trim
- 9) Tiller
- 10) Wand bunge cord tension



**To be continued**

## Design Challenge 4. Evaluation

Paul Constantine

A big problem with evaluating results of foil-fins was that no data was collected before the project began. So, it was not possible to make direct comparisons and any changes observed were going to be subjective. No measurements had been taken because it had not been decided to make changes prior to the boat being lifted out of water for winter. The only solid indicator of depression of the stern was green growth above boot topping line at back of boat, but this can be caused by the 'splash' effect of waves above flat-water level.

### Indicators at re-launch

When the boat is launched it is 'dry' and not loaded, so it is not possible to make immediate judgements about any changes. Observing water level at stern may have shown a small elevation due to fin buoyancy, but would this just be wishful thinking? The boat is very lightweight, and one person walking forwards or back can make a big difference in levels of immersion. There are two good indicators of immersion. The bow has a distinctive knuckle just above waterline below



which the bow is vertical (See bow BEFORE image left). It was done to gain a few inches of waterline length. At the stern the flared hull extension should be just above water level. I found an old picture of the boat under motor using its previous lighter engine and the water clearance is clear, although the boat would be going quite slowly (see stern BEFORE image right).



### Levels at launch

Below are two AFTER pictures taken from the adjacent pontoon immediately the boat was launched with the new Foil-fins added. Reminder that the boat is unloaded and riding quite high which was how it was intended to be.



The boat is also stationary. It is fortunate, for the purpose of this project that the boat is a trimaran, for this means that the relationship of these two indicators can be viewed whilst aboard the boat itself, rather than having a second craft running alongside to monitor any changes. To see what is happening it is possible to stand or lay on the floats, to watch the variations in waterflow relative to the bow and stern.





## **Lifting the boat**

Before dealing with boats movements in water it is worth mentioning that care had to be taken in the boatyard with placing of lifting slings and the yard had to be aware of sling locations for recovery at end of season when the slings would have to be positioned underwater. Whilst foil-fins are hopefully strong enough to deal with stresses involved whilst sailing, it is questionable that they could withstand compression exerted by slings in lifting the total weight of boat. Also, the boat heels over on each tide when it grounds on its muddy, drying mooring, but it was hoped that the dihedral foil-fins would not be taking the boat's weight sufficient to damage them.

## **Manoeuvring under motor**

The boat being shallow draft, needs some daggerboard to aid manoeuvring, rather like a dinghy needs some centreboard to stop it sliding sideways across the water when being steered. An early trial was to motor in a tight circle without using the board to see whether the foil-fins would assist in gripping the water sufficiently for the daggerboard NOT to be used. This would also indicate whether the foil-fins might reduce the very desirable ability of the boat to change direction rapidly when quick-tacking. After estimating the smallest circle that the boat could achieve without any daggerboard, a small amount of board was deployed. It was quite clear by the reduced circle that there had been very little change from previous performance, if any, in the manoeuvrability of the boat. Its agility had not been impaired.

## **Early Sailing**

The boat was taken out in relatively light conditions with fluctuating F3 wind conditions and observed from the float whilst beam reaching. The boat would go from 1-2 knots in the lulls, to 4-5 knots in the puffs. This speed variation was very useful for seeing different water behaviour at different speeds. Initial observations were not quite what was expected.

The best observations were from the elevated float on the windward side of the boat and the foil-fin which would be doing the most significant work would actually be the opposite foil-fin that would be more deeply immersed. The water was sufficiently clear to be able to see shadowy images of the aft daggerboard (which we refer to as the trim-board) and the windward foil-fin.

## **Wave-making resistance**

Maybe at this point I might mention 'waves'; both bow and stern. I want to keep this simple, because I did not research it in any way, but I had observed the way that the bow and stern waves form on boats and I knew the basic information that a boat displaces its own weight of water, to move forward its own length. I also understood that if a boat exceeds its own speed/length ration of about 1.34 it starts trying to climb over its own bow wave; the stern begins to squat and the boat's speed is limited. I also knew that these things are generalisations that can be refined and if I wanted to delve into the mathematics about coefficients of 'friction', 'prismatic and Frouds' I could completely baffle myself – so I didn't go there.

One other factor related to the trimaran was that of interference of waves between hulls running alongside each other. I left that to more expert people like John Perry and Richard Woods who have discussed such issues on the Internet.

What I expected to see was a bow wave followed by a long trough and then a rising stern wave as the boat came to its 'comfortable' top speed for its length and 'fatness.' The energy to make the waves

comes from the boat's propulsion system – that is sails, not engine in this case. The magnitude of the wave-making resistance is a result of the speed of the craft. At very slow speeds there are almost no waves. As the boat's speed increases, the bow wave is generated and then the stern wave or 'wash'.

### Fin/Foil location

The front of the foil is about level with the forward face of the aft beam. The rear of the foil is roughly level with halfway along the rear cabin window.



### Initial observations

It could be seen that the level of the water running along the windward side of the hull was fairly constant compared with the boot topping line, except above the foil-fin where it was lifted, then dipped behind it and then lifted even higher again, under the craft stern. Faster the boat went, the more pronounced this effect became.

The lift of water behind the foil-fin at stern was quite marked and the wave created rolled outwards from the boat in a distinct tubular form. The hull is shaped to have a curved knuckle where the rounded bottom of the boat joins with angled, hull panel (see below). The rolling wave being produced was being turned by this curving projection above the foil, possibly producing some lift. I speculated that the water running close against the hull was being lifted and compressed by the fenced foil at its narrow front end, but then released in contact with the hull to be rolled by the curved projection of the hull. The picture also shows the attachment board for an outboard engine which is mentioned below.



At slow speeds my body weight on the elevated windward float brought the bow knuckle down to cut the water when I was at the forward beam. As boat speed increased to about 5 knots. I was able to move backwards on float to be level with front of cockpit whilst still maintaining bow knuckle in contact with the water. This appeared to demonstrate that craft stern was being lifted by the water as the speed increased. This was a desirable effect that would maintain the trim of the boat when

cockpit was filled with people. The sails deliver power to depress bow of boat, so how much of this effect was due to the sail and how much to the foil-fins is uncertain. It would have been good to have conducted this experiment before the foil-fins were added.

### **Elevating the stern**

I began to see that the stern could be lifted in two ways. 1. Foil Leverage. The foil generate lift rather like the aeroplane wing by creating low pressure on the upper surface to make the wing 'push' (actually suck) upwards. 2. Water pressure. There appeared to be a release of the compression of the water from the underside of the foil as it departed the rear edge. This created an upward acceleration of the water flow. This upward movement was added to the natural stern wave that then pushed the stern of the boat upwards.

### **Problems**

I noticed that the wake was making much more noise than usual. My wife liked this as it sounded like a babbling brook. The boat was making much more wake than before and this disturbance pointed to inefficiency.



A photograph (above) taken at distance from another boat showed the disturbance created by the lifted stern wave. On another occasion in heavier weather, we caught a gust and the boat tried to exceed her usual 8 knots in these strong conditions. As it did so, I could feel and hear a number of blows to the stern of the boat. The stern wave was being lifted high enough for the water to impact plywood board on rudder that allows me to attach an emergency outboard (see earlier picture of rudder). The exhaust outlet can be seen on the port side towards the stern. The lifted stern wave was submerging it quite deeply. This was not good.

### **A remedy**

I decided that maybe fences on the foils were holding and compressing water excessively. If the fences were not there the water could flow more smoothly and even run off the sides of the fins instead of being gripped and funnelled into the lifting stern wave. The front of the fences produced only a narrow gap and their flat, outer faces may be creating disturbance. I had the boat lifted out. I cut off the fences, made good the cut corners, re-finished, re-antifouled and re-launched in a day.

The removal of the fences made a big difference to the wake disturbance. I cannot say that it is the same as before the fin/foils were attached, because at average speeds the boat left almost no wake previously, which is a difficult standard to achieve.



Fence in place



Re-finished ready for launch

### Do the foil/fins work?

I **think** they do, but their main effect is dynamic rather than static. I suspect that they have slightly **increased weather helm**, which is a surprise, as I thought the reverse might be true. I **think** that they do this by elevating the stern (as required), but depressing the bow as wind pressure increases. I **think** that they give a steadier ride, by ruling out any slight pitching motion caused by ordinary fluctuations in wind gusts during normal sailing.

**Will I keep them?** Yes, for the time being as I want to evaluate them over a longer period of time.

Boat details/construction can be seen on [MoonshinePublications.co.uk](http://MoonshinePublications.co.uk). GRP Estuary Cruiser

## The AYRS at the 2023 RYA Dinghy and Water Sports Show



Kim Fisher's '8Foota' mini-yacht formed the centrepiece for our stand this year - in the picture above Kim is demonstrating it to Josephine with Mark Hillman, our Treasurer, to the right of the picture. Kim has clearly produced a novel craft which attracted plenty of attention at the show - it's a keel boat with a bow and a stern but no amidships although there is a ballasted keel connecting the bow and stern. It has a really comfy seat for the skipper, with steering and sail controls falling easily to hand. A pull on a cord quickly rolls the sail in or out and simultaneously raises the boom clear of the skipper's head - a practical feature that could perhaps be copied on some more conventional craft. A tiller handle pivoted from ahead of the helmsperson controls the rudder. The cross beam carrying the two small stabilising floats can slide from side to side, a similar idea to Kim's 'Quill' project from a few years ago. If you run aground, you just stand up and walk, wearing your yacht in the style of the hobby horse jockey at an Italian festival opposite (see - we are not the only eccentrics around). Maybe Kim will fill in the design

details for Catalyst once sea trials have been completed. The boat has been afloat but not yet under sail, perhaps that will have to wait for warmer weather since the skipper is mostly immersed while on board.

We had an impressive array of members' project posters on display this year – one could spend an hour or so reading them all. The posters featured recent and on-going projects by Kim Fisher, Mark Hillman, Chris Watson, and John Perry in addition to a few re-used from previous exhibitions. Perhaps next time it would be good to include more posters from AYRS members other than our committee members – contributions welcome. Our exhibition posters are generally based on cardboard backing sheets about A1 format (800 x600 will do) – I found these at about £3-00 each in a stationary/crafts shop. To make up a poster, print off pictures of your project, stick them on the cardboard backing and we can then attach them to our display stands with Velcro tabs.

We display our posters on a set of aluminium display stands owned by the Society, I think they look good and we save money by building our own display and providing our own carpet rather than paying the exhibition company to erect a 'shell stand' for us. Fitting the aluminium extrusion framework together on the day before the show is a good team building exercise for our band of helpers!

Conventional sailing dinghies dominated the stands this year, I think there were just three stands showing hydrofoil dinghies, these being the Wasp, the Skeeta which is discussed in Ian Ward's article in this Catalyst and the Mavarik Moth. The later is a full on competitive Moth built by Fluid Composites, one of the co-founders of this firm being Andrew Whapshott, a former pupil of our Society's Vice-Chairman, Jasper Graham-Jones. I would say that pretty well all the craft on display showed a high standard of finish, only the two boats on the Dinghy Cruising Association stand looked as though they had actually been afloat!

Looking around the show, one display that caught my attention was the Row Vista forward facing rowing system. This is made by an Austrian company, Row&Sail and it was displayed mounted on an inflatable rowing skiff also by Row&Sail. The rowing mechanism which includes either one or two sliding seats mounted on a fore and aft rail together with outriggers and oars is detachable from the hull and can be mounted on other craft including craft not supplied by Row&Sail. The principle of forward facing rowing by a linkage which reverses the movement of an oar at the rowlock is nothing



*Row Vista mechanism for reversing oar motion*

new but this is a really nicely made version that has ball bearings in all the pivots so it works smoothly with negligible friction. The mechanism also allows the oar to be feathered by twisting the handle end of the oar just as you would do with an ordinary oar but in this case with less strain on the wrists since the mechanism slightly gears up the rotation and has less friction than turning an oar in a conventional rowlock, it also avoids the noisy clunks you get when feathering a conventional race oar in a 'gate'. Releasing a catch allows the oars to be

pivoted into a stowed position and the oars are in two parts that sleeve together so with the hull deflated the craft can be relatively portable.

Another feature of the show this year was a separate area for companies selling equipment and tuition for wind and kite surfing and also the new and fast-growing activity 'wing-foiling'. There were also several stands showing electric outboard motors, lithium batteries, electric foil boards etc – another fast-growing section of the water sports industry.

This is clearly a boat show for small boats, and none the worse for that, but if you want to see larger boats you will have to wait for the Southampton show. I think the largest boat displayed was a 27 foot LOA Thames 'A-Rater' which looked huge against the other dinghies.

We welcome a handful of new members who joined the AYRS at our stand but I don't think that is the sole measure of our benefit from attending boat shows. We do need to keep the sailing public aware of our Society if we are not to fade away and boat shows are one of few possibilities we have to do that. We would consider attending Southampton boat show as well as the RYA show were it not for the difficulty for a small voluntary organisation to staff a stand for a period of about 10 days.

Altogether the show worked well for us this year, thanks to our band of helpers who set up the stand and ran it during the public days and also those who store our display equipment and bring it to the venue. – John Perry

## News from our Local Groups

### North West Local Group

#### Winter Meeting held on Saturday 10<sup>th</sup> December 2022

Seven members of the Group, together with four of their wives, plus our Chairman, John Perry, arrived around 12.30 pm. The now traditional buffet lunch was served promptly at 1.00 pm which was enjoyed by everyone. While the wives settled down in the conservatory the AYRS members commenced their meeting around 2.00 pm.

Colin McCowen kicked off the meeting by explaining with diagrams and a short video his latest propulsion method for canoes and rowing boats. The device comprises two 'buckets' one on each side of the craft. The operator sits facing forward. The 'buckets' are

drawn forward by a series of ropes and pulleys such that they are above the surface of the water. Once in their forward position the rope and pulley system is drawn back. This lowers the 'buckets' and they are drawn aft, full immersed. The operation is repeated. Generally speaking this device appears to be more efficient, in terms of effort and speed through the water, than conventional oars. It also occupies less width in the water, thus allowing the raft to traverse a narrower waterway.

Colin's ideas were received with some enthusiasm. This is perhaps the third or fourth attempt Colin had made to devise such a system. Mike Howard mentioned the fact that waterborne excavators utilise their bucket for self propulsion. Colin also showed some photographs of the repairs he effected to a rowing shell. As Colin is now into rowing there followed a discussion about oars and the deployment of them to create the maximum propulsive thrust. Colin's recollections of his

experiences in a rowing shell created some amusement.

Adrian Denye joined in the discussion about the stability of wood and its moisture content for boat building purposes. He suggested that a natural moisture content should lie between 18% to 20%, although microwave ovens can dry out wood to lower levels for some applications, particularly in the furniture manufacturing industry.

John Perry, backed up by Mark Hillmann, gave a report on the 50<sup>th</sup> Weymouth Speed Week held at Weymouth during October. He stated that it was an excellent week. The introduction of hydrofoils seems to have revived a new class of 'conventional' boats which threatens the domination of kite boards. SAILROCKET was exhibited but did not get afloat. James Grogono's foiling catamaran ICARUS was present, now with new owners. Notable boats included VAMPIRE and VARI SCARY although neither were sailed to their full potential due to the prevailing wind conditions.

A discussion took place surrounding future meetings of AYRS. John Perry stated he was pleased to see so many members attending the NWLG Winter meeting. Attendance at AYRS ZOOM general meetings was very good at first but over the whole Covid pandemic attendance had dropped off. He felt that there needed to be a theme or a speaker to generate interest.

The question of an AYRS inspired project was tabled. Adrian stated that in the early days of AYRS, individuals often joined in the discussions on a member's project and so it became a topic for general discussion. Mike Howard pointed out that the AYRS MicroTransat Challenge 2018 was just such a project, involving seven AYRS members. The AYRS Committee had missed a golden opportunity to back this venture by imposing too many restrictions with insufficient funding.

John Perry stated, as a member of the AYRS Committee at the time, he had backed this project but the conditions of the offer had been drawn up by two individuals. (*sadly no longer with us – MJH*). A discussion took place on how Howard Fund Grants are vetted. Adrian felt there was some merit in looking at the commercialisation of AYRS member's inventions. Grants to colleges were discussed. It was felt that only established AYRS members should be considered for grants. As grants were only available to AYRS members, it would be a travesty if someone joined AYRS simply to obtain a grant. The opinion seemed to be that grants to colleges or students should be financed separately.

Colin closed the meeting with some thoughts on his previous attempts at fast sailing. He considered that non capsizing kite sailing was too dangerous, windsurfing too energetic and the way forward might be a combination of sails, floats and hydrofoils. He mentioned the 'towing device' he had demonstrated at Manley Mere several years ago. Mike asked Colin if he had been influenced by the work of Didier Costas. Colin confirmed that he had indeed tried out some of his ideas. He showed several photographs of sailing devices he had constructed and tested.

The meeting closed at 5.00 pm.

## **AYRS Southern Area Meeting held at the Basingstoke Canal Centre 22<sup>nd</sup> January 2023**

As usual we combined an 'all-day' social and technical discussion meeting with our AGM, the AGM taking about an hour during the afternoon of the 'all-day' meeting. The social and technical meeting is reported as follows, for the AGM see the minutes of that meeting.



The meeting followed an informal format with members taking turns to talk about their current projects in between coffee breaks and spells of less organised chat. Most of us relied on the Canal Centre Café for our lunch.

Andrew Ford showed us a photo presentation of his recently completed and beautifully strip built, 17 foot rowing boat. This is based on craft that were used by professional 'guides' to take clients on rod and line fishing trips on the rivers and lakes of Maine, US, around the end of the 19<sup>th</sup> and start of the 20<sup>th</sup> centuries. The boat is almost a double ender having only a small narrow transom and it has an almost straight keel line. No sooner has Andrew completed this boat than he is considering his next one which he thinks could be a trimaran – we discussed the plans he showed us for a 'W17' seventeen foot sailing trimaran.

As always, Kim Fisher has been busy with a plethora of experimental projects. Kim's 'middleless boat' that we plan to display at the RYA boat show this year is already a past project, Kim having moved on to new ideas and he has also joined a model yacht club and is finding out about radio controlled models.

In the photo opposite Kim (at left) is explaining the model yacht hull that he moulded in a length of plastic drain pinched in at one end to form a bow. Down on the table is a blue and white model proa which Kim made many years ago, but he has recently added a radio control system to it, this is installed under the hemicylindrical housing at the rudder end of the craft. A fourth hydrofoil has been added at this end to support the extra weight of the radio system whereas the other three hydrofoils are the original design. Note that the three original foils are all canted the same way – this can work with a proa having surface piercing foils. Kim told us that this model sails very well, skimming across the pond then crashing hard into the bank, the radio control should help mitigate such crashes.



Charles Magnan showed us a half bulkhead he has made for the 24 foot trimaran that he is building. This project is partly supported from the AYRS Howard fund. Charles showed us photos of the lower section of the main hull which is based on a grp Tornado catamaran hull split down the centre line then widened by glassing in a wedge shaped insert and in due course it will also have a stern extension. The half bulkhead that Charles showed us will be joined to a mirror image of itself to form the whole main bulkhead that will carry the mounts for the forward folding beams and a tripod arrangement supporting the rig. The half bulkhead is carbon skinned Corecell sandwich vacuum bagged using the bags sold for compressing clothing and bedding for storage. It looks to be well made and some people thought perhaps stronger than it need be but this is a critical structural part of the craft. We look forward to seeing further progress and especially the section of the craft with the retractable undercarriage which will make it amphibious so that a wheelchair bound sailor could slipway launch it unaided.

With nine persons present, (plus an additional four by Zoom for the AGM only) attendance at this meeting was better than for our previous two meetings at the Basingstoke Canal Centre.

I hope that we can schedule the next Canal Centre meeting for November 2023 but it will be a committee decision to decide on that, we would like at least a slightly larger attendance to justify the cost of hiring a meeting room for the day. We did suggest attendees each make a £5 donation towards the room hire and I think all were happy to do so albeit there is the difficulty that these days not everyone carries any cash. I feel that we should try to keep some

home counties meetings on our program since the Society does have a concentration of members around London and down from London to the South Coast – the Basingstoke Canal Centre is near Farnborough so should be well placed for those members.

(Note added May 2023 – the committee has now agreed to go ahead with meetings at BCC in Nov 2023 and Jan 2024)

## Calendar of Events

*Our events are open to all who share an interest in boating technology so please do invite friends and sailing club members.*

*In general, the place to look for updates to our event announcements is <https://www.ayrs.org/events/> - despite not currently having an active 'Webmaster' (volunteer(s) would be most welcome!) we are making it a priority to keep that section of our website up to date with any changes to our event plans.*

### **6 June - AYRS North West Local Group Summer Meeting**

Note the revised date – this meeting will now be held on a Tuesday. The venue will be near Bowness-on-Windermere in Cumbria. We start with a buffet lunch at 12:00 so need to know numbers for catering. Further activities may include sailing, subject to weather conditions. Contact [treasurer@ayrs.org](mailto:treasurer@ayrs.org) for further information.

### **19 August – AYRS North West Local Group Summer Outing**

Meet at 11:00am at Nantwich & Border Counties Sailing Club. An opportunity to join in the club's open day and sail a variety of dinghies. Contact [nwuklocalgroup@ayrs.org](mailto:nwuklocalgroup@ayrs.org) for further information.

### **9 September – AYRS North West Local Group Autumn Meeting**

Venue TBA. Contact [nwuklocalgroup@ayrs.org](mailto:nwuklocalgroup@ayrs.org) for further information.

### **7 October - 13 October - Weymouth Speedweek with AYRS meeting on the Wednesday evening**

Once again the AYRS will hold a technical meeting on the Wednesday evening of Speedweek, this year that is 11th October 2023. Speedweek is not an AYRS event but the AYRS has a long association with this annual event. Although most of the Speedweek entrants are boardsailors, there were some notable exceptions last year – for example Kyle Stonehouse sailed the Vampire Project hydrofoil catamaran and won a 'fastest of the day' trophy proving to be faster than any of the boardsailors, is that a sign to the future?

Speedweek is based at the Weymouth and Portland National Sailing Academy at the Portland end of the causeway between Weymouth and Portland. The Weymouth Sailing Club where we hold our AYRS Wednesday evening meeting is in Weymouth, at the southern end of the quay on the west side of the harbor.

#### **4 November – All-day Meeting at Mytchett, Surrey**

We meet at the Basingstoke Canal Centre (BCC), at Mytchett (not Basingstoke!) a few minutes from M3 junction 4, postcode GU16 6DD. We have the room from 10am to 4pm. We call this an all-day meeting but feel free to come and leave as you wish. The meeting is a mixture of informal discussion and prepared presentations. Do bring posters, models, small boats/boat parts etc. for display. We usually lunch in the BCC Café. We accept donations, say £5, to contribute to light refreshments and room hire.

**5 November – Basingstoke Canal outing** - A Sunday canal trip is proposed to follow our Saturday meeting. Bring a canoe, yacht tender or other small craft (but not a sailing boat due to overhanging trees). We plan to stop off at a canal side pub of which there are quite a few. If you cannot bring a boat you could still join us for a pub lunch and maybe take a walk on the canal towpath. We hope for good weather – well, there is always a chance of that even in November! Contact [chairman@ayrs.org](mailto:chairman@ayrs.org) for further info.

#### **9 December - AYRS North West Local Group Winter Meeting**

A social and technical discussion meeting. Venue will be at Lydiate, Merseyside. Meet 12:30 for 13:00 buffet lunch. Contact [nwuklocalgroup@ayrs.org](mailto:nwuklocalgroup@ayrs.org) for further information.

**21 January 2024** - All-day Meeting at Mytchett, Surrey with AGM included during the afternoon. Venue, timing, and other details as for 4 November meeting above. Our AGM will start at 14:30 London time and will be a hybrid meeting using Zoom.

**Zoom Meetings** – We plan to continue with Zoom on-line meetings over the Winter 2023/24. These to be held at 19:30 London time on a monthly basis from December 2023 to April 2024 – dates will be announced at <https://www.ayrs.org/events/> and by email. We may be able to include prepared presentations in some of these meetings, otherwise it will be general discussion of boating technology. The Zoom meetings we held in Spring 2023 attracted a reasonable attendance and included lots of interesting discussion, even though covid restrictions had mostly been relaxed by then. So it seems that Zoom meetings are not just for pandemics and for the AYRS they are the only practical way that much of our widely dispersed membership can meet.

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In addition to the above events we hope that we can repeat the gatherings we held in Devon and Suffolk last year - at Alton Water reservoir near Ipswich and at Mount Batten near Plymouth. Further info will be posted by email and at <https://www.ayrs.org/events/>

The Mount Batten meeting required very little organizing, other than announcing it to our members by email. We simply said that we would meet at Mount Batten public slipway and have a Saturday evening meal at a local pub. Several members arrived by water so we were able to sail in company over the weekend, booking three boats into the nearby marina for Saturday night. If you would like to arrange something of this kind as an AYRS event do make contact. Requirements could include:

- a sheltered stretch of water (does not need to be salt water)
- a launching possibility for boats that arrive on road trailers
- a pub/restaurant/sailing club as an evening gathering point
- a possibility for overnight berthing for anyone staying on board overnight.

There must be a few places that meet these requirements – let us know!

## Your AYRS Committee Members

|                                        |                         |                    |
|----------------------------------------|-------------------------|--------------------|
| Vice President                         | Dave Culp               |                    |
| Vice President                         | Michael Ellison         |                    |
| Chairman                               | John Perry              | chairman@ayrs.org  |
| Vice Chairman                          | Jasper Graham-Jones     |                    |
| Hon Secretary                          | Marcus Lee              | office@ayrs.org    |
| Hon Treasurer/<br>Membership Secretary | Mark Hillman            | treasurer@ayrs.org |
| Hon Editor                             | Robert Biegler          | editor@ayrs.org    |
| Hon Editor                             | Jasper Graham-Jones     | editor@ayrs.org    |
| Hon Editor                             | Ben Mull                | editor@ayrs.org    |
| Webmaster                              | <b>Volunteer Wanted</b> | webmaster@ayrs.org |
|                                        |                         |                    |
| Committee                              | Robert Biegler          | committee@ayrs.org |
| Committee                              | Kim Fisher              | committee@ayrs.org |
| Committee                              | Andrew Ford             | committee@ayrs.org |
| Committee                              | Niels Daikin            | committee@ayrs.org |
| Committee                              | Michael Ellison         | committee@ayrs.org |
| Committee                              | Chris Gould             | committee@ayrs.org |
| Committee                              | Tim Glover              | committee@ayrs.org |
| Committee                              | Mark Hillman            | committee@ayrs.org |
| Committee                              | Graham Ward             | committee@ayrs.org |

If you are trying to contact a specific member of the AYRS Committee, please mark your email for that person's attention

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

## **On the Horizon ...**

Balanced Foils, Parts 2 – 4

Howard Fund Revisited



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