# MULTIHULL CAPSIZING

A.Y.R.S. PUBLICATION No. 63

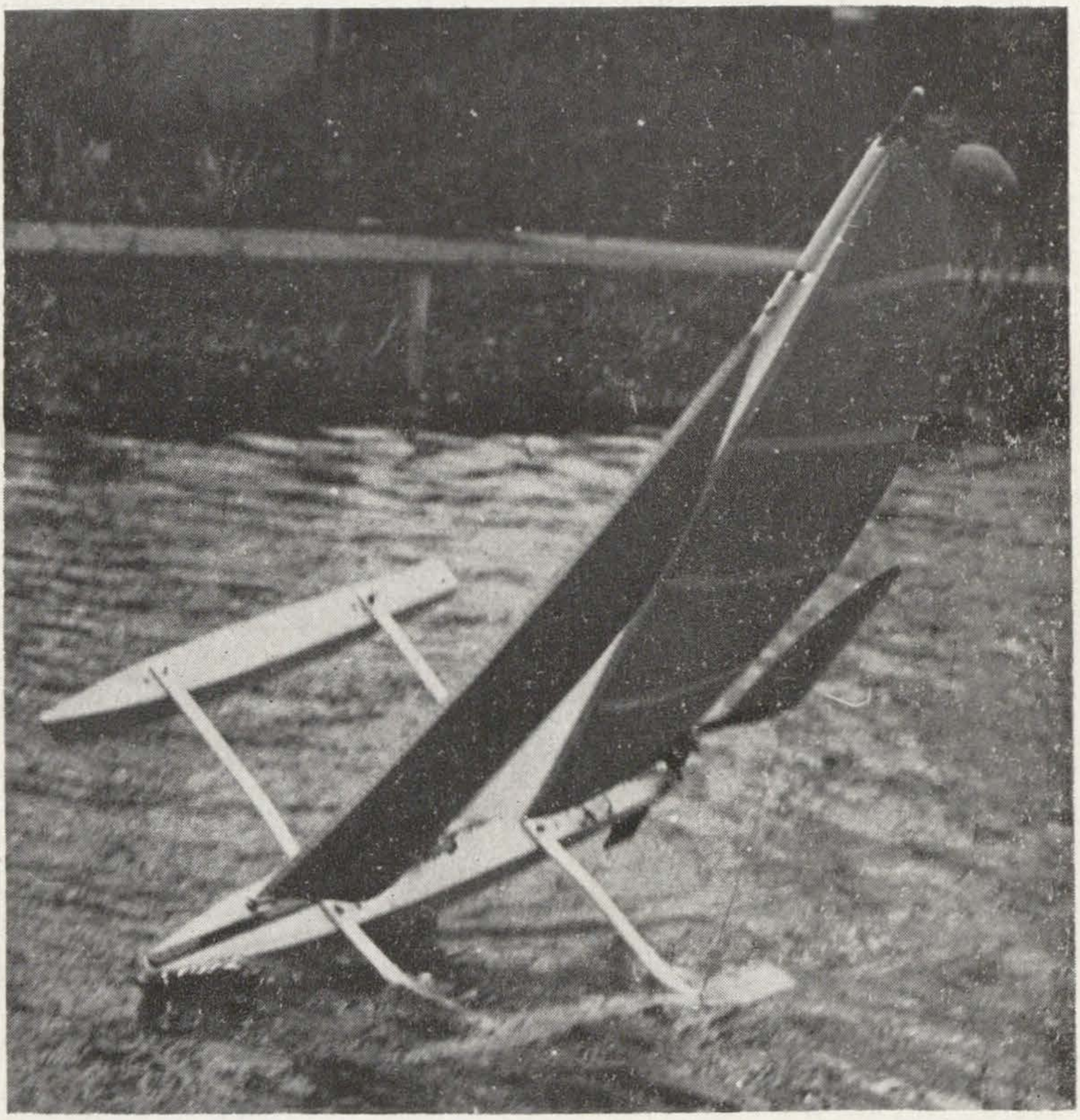

Photo: Vic Smeed

*How a Trimaran capsizes in a scale wind of 60 m.p.h.*

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# THE AMATEUR YACHT RESEARCH SOCIETY

(Founded June, 1955)

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# EDITORIAL

January, 1968.

*The West of England Research Group.* Fred Benyon-Tinker, with his characteristic vitality, having initiated A.Y.R.S. groups both at Redhill and East Grinstead, has now called the inaugural meeting of a group centered in the Torquay-Brixham region. This took place on October 29th, 1967 at the Roslin Hall Hotel, Torquay, a room being kindly lent by the manager, Mike Beeton. I was lucky enough to be present and was immediately struck by the keenness and enthusiasm of all present. Eleven of the possible 17 A.Y.R.S. members were present but experience shows that local people join when the meetings start and a great success seems assured for this group.

At the meeting, after the formalities of when, where and how often to meet had been arranged, those present aired their views about their interests. All seemed to agree that catamarans and trimarans were now "conventional boats" and while hydrofoils still needed to be "conventionalised," technical studies with wind tunnel and test tank would be most fun. Fred Benyon-Tinker already has the wind tunnel made by the late Mr. Harrington-Hudson and it was agreed that a recirculation test tank with the water flowing in a horizontal plane would be simple to make and would be very suitable for a "drag angle" study with the models in "laminar flow" as in the Bruce tank.

This group is far from lacking in quite exceptional talent. "Stumpy" Dibb is an engineer whose knowledge of yachting, both technical and practical is encyclopaedial and the Walkers, father and son, are highly informed about fluid dynamics.

John Walker is going to devote next summer to getting Martin Sanderson's flying hydrofoil sailing. Several other members present, though saying little, obviously were well informed and eager to do studies.

However, in accordance with the A.Y.R.S. overall policy, it was decided to keep the meetings on the practical plane such as are held in London and, as far as possible, keep the research done also on a level which could be explained to every member.

*Premises.* This was the kind of A.Y.R.S. which I envisaged when the Society was started but, at that time, there were neither the men nor the technical background to go ahead with it. Now, this group has formed with the men to do the work and the technical knowledge of methods and apparatus to proceed. All they need is a shed to keep their apparatus where members from all over the world can call either to chat with the members or bring models for testing.

*Winter Meetings*, 1968. Dates and subjects for 1968 are as follows:—

Tuesday, 2nd January, 1968. Hydrofoils.

Tuesday, 6th February, 1968. Colin Forbes (*Anchor Films Ltd.*) will show 3 films:—

1. "Tri in December"—Toria, with Derel Kelsall and Eric Tabarly rounds Lands End on her way to London.

2. "World Tempests" 1967 Championships in Weymouth Bay.

3. "IYRU A & B Cat Trials"—1967 at Sheerness.

Tuesday, 5th March, 1968—"Developments in Yacht Performance Measurement" by John Hogg.

Tuesday, 2nd April, 1968—The 1964 Single-Handed Trans-Atlantic Race.

*Meeting Tapes.* We have the following meetings on tapes which A.Y.R.S. groups can use and they will be sent for the cost of postage and £2 deposit. Non-member yacht clubs and non-members will be charged £3 with £2 deposit. Overseas groups can buy tapes for £4 ($12.00 U.S.).

1. The Round Britain Race. Speakers various.
2. Some yachting developments. Michael Henderson.
3. Self Steering. Speakers various.
4. Flying Hydrofoils. Christopher Hook and others.
5. Ocean Catamarans. James Wharram.
6. Catamaran Capsizes. Bill Howell, James Wharram and others.
7. Model cats and tris. R. C. Blick.

All of these are on 7 inch reels at $3\frac{3}{4}$ inch per second but can be had on 5 inch reels by special application.

8. Yachts for the 1968 Trans-Atlantic Race. Speakers various. H.R.H. Prince Philip in the Chair. This can only be used by A.Y.R.S. groups. This is on 5 inch or $5\frac{3}{4}$ inch reels at $3\frac{3}{4}$ inch per second.

*Complete Sets of Publications.* Only about 15 complete sets exist outside of the British Museum and the National Libraries. Michael Gilkes is only missing Nos. 22 and 28. If anyone has these copies to spare, they would be doing the A.Y.R.S. a great service by sending them to him.

*Wager.* Mike Butterfield has bet your Editor a bottle of Champagne that the Atlantic will not be crossed from East to West in under 14 days within the next ten years. The record for this voyage now stands at 18 days for a square-rigger (I believe) and the yacht "Dorade" did it in 21 days. I am relying on the ingenuity of our members to drink this bottle at Mike's expense.

*Writing to the Yachting Press.* The A.Y.R.S. Committee would like our members who write letters to the yachting magazines in all countries to follow their signatures with the words: "Member, Amateur Yacht Research Society." We feel that, as your letters are likely to be original to the ordinary yachtsman, you should acknowledge that the background to your ideas came from our Society.

*Increase in the Cost of Publications.* The expenses of producing our publications has been steadily rising, owing to their increase in size and rising printing costs. We are therefore sorry to have to announce that we have had to increase the price of all publications from No. 59 onwards to 7/6 or $1.50. Members, of course, get their publications as a result of their subscription, giving them a reduction for the years 1966-1967 and for 1967-1968.

*Increase in Subscription.* Upon careful costing of our business side, we find that we can no longer hold British subscription down to the very low figure with which we have been working. Our Committee therefore sees no alternative but to increase the British subscription as from the 1st October, this year (1968). The increased subscription will be £2 and $5.00, though "Associate Membership" is being studied with a reduced subscription.

*Apology for Late Publications.* Many of our publications recently have failed to be sent off on the first day of the quarter. This has been due firstly to the large size of the publications occupying the printers' time. Secondly, with such a mass of material, printing snags appear and Thirdly, with such long proofs to correct, they cannot be "read" by me at one sitting but take several days. However, the delay with this issue is entirely due to the fact that my own capacity for long and continuous hours of work after earning my living simply vanished (I hope temporarily). The April issue has been pretty hard to do for several years because that is my busy season. I blame my advancing years for this "moral weakness" and a difficulty in taking my mind off hydrofoils, which are so very exciting at the present time.

*The A.Y.R.S. Burgee.* Members are urged to sail under the A.Y.R.S. Burgee and put A.Y.R.S. on the transoms of their boats.

*Binders for A.Y.R.S. Publications.* These can be got from EASIBIND LTD., Hartley House, 4, Uxbridge Street, London, W.8 at a cost of £1 1s. 0d. each, post paid. Each binder takes about 20 publications.

"*The Downhearted Boat-Builder.*" John Norton has now nearly finished his trimaran but appears to be more downhearted than ever and despairs of ever getting it finished. He rang up one day to say "Sell it, give it away—anything." If anyone would like to help him in any way, they can ring Folkestone 55428 or write to him at 66, Shorncliffe Crescent, Folkestone.

*Technical and Semi-Technical Papers.* The following papers have been received and will be lent to members on request:—

"Twin Keel Yachts—Development over 45 years." Rt. Hon. Lord Riverdale, D.L., J.P.

"Class C Racing Catamarans." Maj. Gen. Parham, A. Farrar and J. R. Macalpine-Downie.

"The Behaviour and Stability of Wind Operated Steering Systems for Yachts." By A. L. Buchan and J. R. Flewitt.

"Some Further Experimental Studies of the Sailing Yacht." By P. G. Spens, Pierre DeSaix and P. W. Brown.

"The Tactical Implications of the Polar Curve of Yacht Performance." P. V. MacKinnon.

*Hydrofoil Victory.* Our last publication, I am glad to say, fell upon an astonished world with what I think was a considerable impact. While not actually shouting about it, members seem to have been set thinking in terms of actually building hydrofoil boats and several models already seem to be in the course of construction. I myself am having the *KINNEGOE CRUISER* built by Derek Kelsall and intend to use it as a single hulled boat in inland waterways to begin with. The hydrofoils can be fitted later but I feel that it is time for me to get some practical sailing hours. On the whole, from member's comments, it does look as if the title "Hydrofoil Victory" was most apt.

*Low Aspect Ratio Hydrofoils.* Dr. Feldman, who had the little 8 foot trimaran with rectangular foils, has done some experimenting with hardboard foils on the end of a slotted pole and finds that the

best wave formation and least fuss comes from a beheaded 45°, 45°, 90° triangle with a depth of 9 in., a bottom of 9 in. where the right angle has been cut off and a top of 27 in., the two top angles being each 45°. He thinks this shape is better than the low aspect ratio triangles we drew in the publication, as well as his rectangular foils.

Mr. Bagnall, of Liverpool, has sailed his scow type boat with a lip-shaped low aspect ratio Bruce foil and float and finds this very useful. This boat will be described in full later this year.

Obviously, the final shape of low aspect ratio foil has yet to be found but it is likely to be between these two types.

## "THE A.Y.R.S. AWARD" FOR THE 1968 SINGLE-HANDED TRANS-ATLANTIC RACE

In June, 1967, one of our members, Slade Penoyre wrote in suggesting a very interesting piece of research. This was to find out the relationship between speed and cost of various boats by awarding a trophy for the S.H.T.A.R. this year on a handicap based upon cost. He pointed out that theoretically the speed of sailing yachts should be proportional to the sixth root of their cost in money. Unfortunately, when we approached all the informed people and those directly interested such as the Royal Western Y.C. of England and the Observer, costing proved to be almost impossible to administer and we had to achieve our objective in another way.

We felt that, owing to our "Amateur" status, our award should not be given to sponsored yachts and, of course, we wanted to include multihulls for which there was no handicap prize. The A.Y.R.S. Committee therefore decided upon the following:—

"That the A.Y.R.S. award a trophy to the winner in the 1968 Single-Handed Trans-Atlantic Race on a handicap based upon the square root of the L.W.L. who can sign a declaration that he has received no financial assistance in excess of £150 either in fact or in kind from any source other than his family or by way of a loan which he is bound to repay in time. Multihulls will be eligible for this award. Single hulled boats less than 24 feet L.W.L. will be handicapped as if they were that length. Trimarans and catamarans less than 30 feet L.W.L. will be handicapped as if they were 30 feet L.W.L. The award will be known as '*The A.Y.R.S. Award.*'

The handicap restriction is due to the opinion of the S.H.T.A.R. Committee of the Royal Western Y.C. of England that very small

yachts should not be encouraged to enter this race though, in keeping with the general idea of the race, they should not be prohibited. The same philosophy prevents them from *demanding* self-righting ability in multihulls or the carrying of righting devices though they are prepared to advise entrants to carry such equipment.

In order to carry out the original research envisaged by Slade Penoyre, entrants will be asked to estimate the costs of their boats at 1968 prices and the speed/cost ratios can be worked out.

"*The Lone Sailor.*" We follow with a poem I wrote for my own amusement. However, it seems to entertain so is included. I note that when it is read by someone who has actually done a single-handed ocean crossing, an odd look comes on their faces which could be embarrassment. I apologise if this is so.

## I'LL GET THERE

BY

JOHN MORWOOD

Amateur Yacht Research Society

If this yacht holds together, I'll get there.
And she'll make to weather, I'll get there.
When the seas become enormous, and the winds decide to storm us,
"Stick together" they inform us. I'll get there.

*Chorus:*

I'll get there. I'll get there.
I'll get there. I'll get there.
By the light of the silvery moon.
Happy is the day when the wind will blow my way
And I'm reeling, rolling, reeling, rolling on—I'll get there.

If the mast will keep upstanding, I'll get there.
And stays don't start a-stranding, I'll get there.
I would be a sluggish rover, if the blooming mast went over.
I'd have a spot of bother. I'd get there.

If the "thing" will keep Self-steering, I'll get there.
And she will keep her bearing, I'll get there.
It's a pretty little gadget which seems to work like magic.
But, if it breaks, it's tragic. I'll get there.

If she'd only stop her pounding, I'll get there.
And ease up on her bounding, I'll get there.
It is just the corkscrew motion in this ruddy patch of ocean
Which makes me lose my potion. I'll get there.

I'm not completely happy I'll get there.
Should take advice from Pappy. I'll get there.
With my gin and tranquilizers, stark terror in me rises.
I won't win any prizes. I'll get there.

*For the cat sailors:*

If she doesn't flip right over, I'll get there.
And hulls don't leave each other, I'll get there.
Now this waggon's really shifting. The weather hull's just lifting.
It's better than just drifting. I'll get there.

*For the single hull sailors:*

If I hit a log; get stove in, I'll get there.
And downwards start a-moving, I'll get there.
If I get a great big crack in and cannot get a sack in,
There are tons of lead a-dragging. I'll get there.

I'm looking at an ice berg. I'll get there.
It's not a very nice berg. I'll get there.
It is bitter cold and chunky. It makes me feel quite funky.
T'would only suit brass monkey, I'll get there.

Now the fog has come and found us. I'll get there.
The stuff is all around us. I'll get there.
That damn steamer's hooter's blowing. On his radar screen I'm showing.
But where the Hell's he going? I'll get there.

If the wind would blow a little I'd get there.
I'll boil another kettle. I'll get there.
I've discovered now what matters. You don't move when it's flatters
And things are going slatters. I'll get there.

If I can stand the cooking. I'll get there.
It's just a bit black-looking. I'll get there.
Those tins I got from Mabel's have now lost all their labels.
There's jam on all the tables. I'll get there.

I think I've found the beacon. I'll get there.
If it's the one I'm seeking, I'll get there.
This fix will need some thinking. What is that light that's blinking?
My navigation's stinking. I'll get there.

*FINALE:*

The voyage now is over. I've got there.
I'll never do another. That I'd swear.
It's nice to be on shore now. I'm never sailing more now.
But, if you press me—Cor now—I'd be there.

*Chorus:*

I'd be there. I'd be there.
I'd be there. I'd be there.
By the light of the silvery moon.
Happy is the day when the wind will blow my way.
And I'm reeling, rolling, reeling, rolling on—I'd be there.

## THE SWARM PRINCIPLE

BY

JOHN MORWOOD

Last year (1967) after reading an article saying that the British government was spending a huge part of our National income for us on this and that, including National Defence, it occurred to me that they really should buy yachts for all of us. Naturally, there would have to be some excuse for this and the thought of covering the whole Atlantic with trimarans seemed logical and, if they had anti-submarine weapons, the situation would appear to meet our desires and, at the same time be just about within the bounds of possibility.

The idea seemed amusing and, as I had to find some subjects for our winter meetings, I suggested to some of the Committee that we debate it. We all thought it would be fun and so it was laid on.

It is hard to work out how any idea comes to one's mind but I remember having a most amusing yarn with an American member who suggested that yacht racing was getting dull and that, if the racing fleets were equipped with cannon firing bits of rag which stained an opponent on impact, it would add a new dimension to yachting. We finally decided that the Royal Ocean Racing Club should fit out a fleet to capture Newport, Rhode Island with the Cruising Club of America yachts as defenders. It was a most entertaining evening.

Personally and professionally I am a pacifist. Thought not a fighting man owing to my profession, I was greatly upset during the war not only by the loss of our aircrew (I was in the R.A.F.) but by the devastation of the German cities—I had some bad nightmares at the time. However, intellectually I realise that marauders must be contained and, if people set out to kill and destroy, they must be stopped. However, I must say that I didn't really take our proposed debate very seriously.

When the notice of our debate was sent out, our anonymous member—a distinguished Naval tactician—wrote his article "National Defence: the Swarm Principle," dealing with the matter seriously and offered to send it out at his own expense. As his article contains an honest viewpoint, honestly written, we saw no objection to this and it was duly sent to all members. This involved neither cost nor work to the A.Y.R.S. As, however, it has upset many of our members, we apologise to all those so offended and will be more circumspect in future. In fact, we have only had four letters of disapproval but I have no doubt that many other people feel like the writers.

Sir,

I have read "National Defence: the Swarm Principle" with dismay.

Apart from my personal opinion that it is nonsensical, I feel strongly that such matters are quite irrelevant to the purposes of our Society, and to dabble in them seriously risks the reputation we may legitimately claim in serious amateur research.

May I plead that the Society's time and money are not wasted in future on such futilities.

J. SIDGEWICK.

Leigh Cottage, Freshford, Bath, Somerset.

Dear Dr. Morwood,

Last weekend, I sent my annual subscription to the A.Y.R.S. for, I think, the fourth year of my membership. However, after receiving a communication through the post entitled "National Defence," wisely written anonymously but nevertheless bearing prominently the name of its publishers (A.Y.R.S.), I am beginning to wonder if I should have done so.

I must, sir, raise the strongest possible objection to any part of my subscription being spent on the printing and circulation of such unmitigated rubbish as this thing; and I am not the least bit surprised that the member concerned preferred to remain anonymous.

Apart from the trivial nature of the contents of this circular, I would draw your attention to the Oxford English Dictionary definition of a yacht which is "a light sailing vessel for racing; vessel other than a rowboat or canoe kept for owner's pleasure." I suggest that this definition is still more or less relevant today, and the name of our Society implies a non-commercial and non-military interest in furthering the interests of boats built fundamentally for the pleasure of their owners.

I have been associated with a number of military projects in the course of my career, particularly in the aircraft industry, and apart from being doubtful about their actual contribution to National Defence and the enormous expense incurred, I have no wish for activities I take up for pleasure to have military associations.

I would be perfectly happy to have this letter published in the A.Y.R.S. journal (not anonymously) to make my views on this ridiculous circular more widely known.

PAUL ADDISON, B.SC., G.I.MECH.E., G.I.M.A.

33, Whitecroft Road, Newcastle upon Tyne.

Sir,

Thank you for the circular "The Swarm Principle" by A. Member. The principle seems sound except that in my opinion sail, even with auxiliary, is inadequate for this task. However, I write to complain of the author hiding behind the anonymity of "A. Member." In a dreary world, what glorious madness! We need this man as Prime Minister. England would be great again!

TOM CARPENTER.

154, Barclay Street, Leicester.

*Other Letters.* Several members and friends sent letters of approval and provided reasoned arguments for "The Swarm Principle" with additional ideas. These all took the matter seriously and, in view of the objections, I do not feel that we should proceed with the argument, from that point of view. However, Jack Knights wrote the following in Yachts & Yachting:—

"Multihulls make one think of the Amateur Yacht Research Society. The A.Y.R.S. makes me wonder about the dividing line between constructive research and pie-in-the-sky nuttiness. Their latest contribution certainly fits into the second category. Written by an anonymous member and circulated with the Society's blessing, it deals with the unlikly subject of National Defence and seriously

suggests that mass fleets of 60 ft. cheaply produced sailing trimarans should escort our convoys. The paper is headed 'The Swarm Principle' but I say that the bees are in the author's bonnet, if not the bats in his belfry . . . . . Sir Peregrine Henniker-Heaton, Bt. is in charge of the reception of overseas visitors on the A.Y.R.S. stand at the Boat Show . . . . . 'How do you do?' . . . . . 'How do you do, but I deed not catch quite the name . . . . '"

Naturally, we couldn't let this pass and we replied with the following letter:—

THE EDITOR, Y. & Y. 10th January, 1968.

Dear Sir,

We, in the A.Y.R.S., noting Jack Knights' quandary about us being interested in what he calls "pie-in-the-sky nuttiness" are not a bit surprised. Jack is, of course, a very practical man and probably does not realise that all research starts from "Ideas men." They create the problems. The "Engineers" then take up these ideas and state them for the practical men to build. We have all these types in the A.Y.R.S.

When Sir Peregrine Henniker-Heaton Bt. made and sailed his catamaran in 1922, he was merely one of the succession of "Ideas men" to whom we owe the modern catamaran. However, the A.Y.R.S. collectively contributed a very great deal to catamarans, as our members know. One wonders what Jack Knights was doing in 1922?

The wing sail too, which is now used on C Class catamarans was the result of the cerebrations of "Ideas men" and their suggestions and hardware have been shown in our publications for years.

In the case of the trimaran, we actually assembled the "Ideas" before the boat appeared in any modern form, except for one or two experimenters whom we later heard about. We thus "forced" the development. And we are doing the same thing with hydrofoils—our latest publication, "Hydrofoil Victory" shows that we have produced the "Ideas breakthrough" and our members will not be long in producing the sailing hydrofoil boats.

Personally, I would have thought that Jack Knights would have been very interested in our debate "That the Atlantic could be successfully defended against nuclear powered submarines by the use of 30,000 sailing trimarans, each 36 feet long." Only a very "practical" man would fail to see the delightful consequences of this being our naval strategy. 30,000 yachts would be issued to us by the government to be kept in permanent ocean-going trim and each by the use of depth charges and rockets could attack any hostile craft. In time of war, they could be spaced over the whole Atlantic with each not more than 10 miles from the next and the whole ocean monitored.

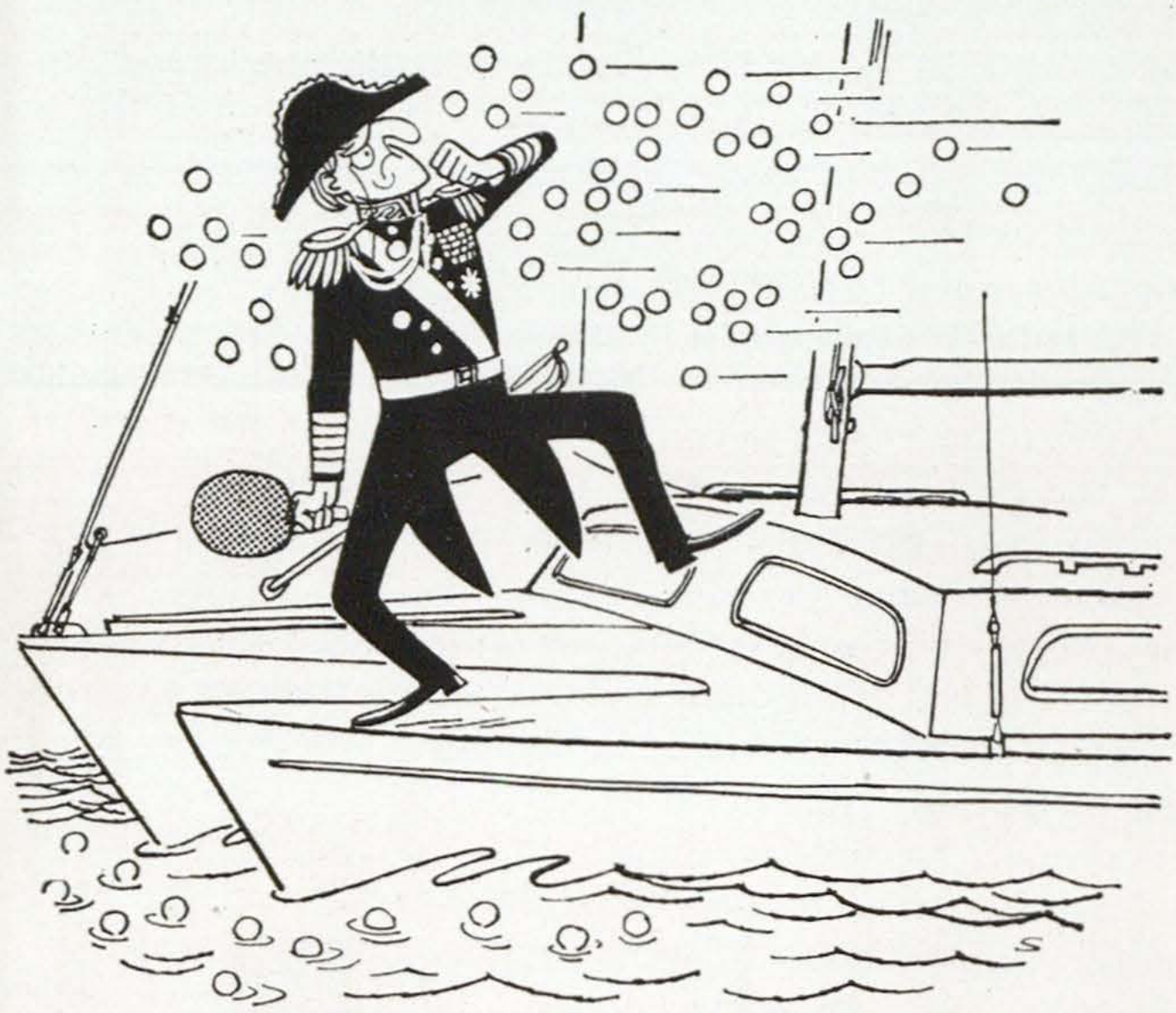
Now that we no longer can afford a fleet of battleships, let us still keep to the oceans in the biggest ships we can afford which will protect our merchant shipping. These would appear to be trimarans.

The paper to which Jack Knights refers was written by a well known naval strategist and, though we have had some critical letters, one member's letter stated:—

"While I am not sure that I agree with every word, I think that the writer is a man of such originality that he should immediately be made Prime Minister. Then Britain could again become great."

Perhaps, if we built a fleet of 30,000 trimarans, the Russians might do the same. If now, we could limit the armaments of these craft to muzzle loading cannons firing ping-pong balls filled with a dye which made a permanent mark upon their adversary when a direct hit were scored, we could have a most agreeable form of warfare. The losers would be the fleet with most dye marks.

I can imagine Jack Knights laying his craft alongside an enemy trimaran with the utmost of his great tactical skill and letting off a



*Drawing by courtesy of Yachts & Yachting.*

broadside from his muzzle loading guns, leaving the enemy trimaran completely stained blue from his ping-pong balls.

I hope your readers will agree with me that introducing some imagination and "Ideas" into yachting would make it a far more enjoyable sport.

JOHN MORWOOD.

# WEIR WOOD MEETING 1967

BY

DENNIS BANHAM

Highlands, Blackstone, Redhill, Surrey

Another of our A.Y.R.S. Weir Wood meetings has now come and gone but, unlike previous years, we were not so fortunate with the weather and the radio "Weather man," being so certain of his facts, put them over so convincingly that many members living rather far afield were deterred (and who can blame them) from attending.

However, those that did attend managed to sail a little between the rain squalls on the Saturday, and have a reasonably good day on the Sunday (very strong winds indeed, but at least the sun came out in the morning and, although it was overcast after lunch, the rain kept off, much to everyone's relief).

The decontamination business was also rather tedious and, like the Weir Wood Sailing Club, formed last year, is something we have to put up with if we are to continue sailing on this beautiful stretch of water.

The boats that turned up were as follows:—

*TRIMARANS*

A. Rodney Garret's recently built 18 foot *AU-LAIT* (with foils).
B. J. C. L. Candler's 13 ft. 6 in. *QUEST*—Dory-shaped main hull. Wing Sailmast.
C. Tony Harmsworth 16 ft. *FILLY*. Wingsail mast and wishbone boom.
D. Andre Kanssen's 12 ft, with neat forestay attachment.
E. John Partington's *TABUARIKI* with 2 floats this year.

*HYDROFOIL CRAFT* (As distinct from trimarans with foils)

A. Martin Sanderson's and John Morwood's craft (see A.Y.R.S. No. 62) 20 ft. 16 ft. beam.
B. James Morwood's *TRI-SCAPH* 16 ft. LOA, Beam 7 ft. (approximate guess).

*CATAMARANS*

Eric Scott's beautifully tuned *FLYING KITTEN* and possibly others such as Charles Bull's and Harry Ralph's but these, if there, (and I didn't see the boats, though I did see them) were lost in the medly of Club Boats.

*MICRONESIAN*

Chris Hughes unique *PROA* with new steering and sail controls.

The craft which really caught the eye for beauty and real effortless sailing was Rodney Garret's *AU-LAIT*—a trimaran using a Manta B hull and streamlined floats. This was a follow on from his previous year's experiments with one of S/L. Anderson's Shark trimarans with foils beneath the floats. This year's craft was bigger and the floats

*Rodney Garret's AU-LAIT.* (*Photo: Anthony Linton*).

longer. The very cleverly designed and beautifully made foils were certainly most efficient indeed. They were made to fold out when submerged and fold flat and to retract into the floats, the final touch being flaps which folded over the retracted foils. When sailing with her, I was able to control both foils and the craft lifted smoothly onto them, giving a wonderful feeling of actually flying. There was very little turbulence, if any, around the foils and only a very small amount

*J. C. L. Candler's QUEST.* (*Photo: Anthony Linton*).

around the main hull—a delightful craft to sail and own. However, Rodney is making yet another hydrofoil boat now and, though we cannot see how he can bear to part with such a lovely craft, he cannot keep her and is willing to sell, so if anyone wants a boat which will excite interest and admiration while giving first class sailing, he can write to Rodney Garrett whose address is: 36a, Duke Street, Brighton, Sussex.

J. C. L. Candler's *QUEST* is a Dory-shaped 13 ft. 6 in. main hull with V shaped outriggers and wingsail mast, plus a mast-head gantry. Nicely made, the rig appeared to work well. The sturdy construction enabled Quest to stand up to the gale-like gusts which turned so many of the W.W.S.C. dinghies over. An honest looking craft and one which could give a lot of pleasure to its owner.

C. Tony Harmsworth's 16 ft. *FILLEY* trimaran, like all the other members' craft was beautifully made and had several special features. A slim, strong wingsail mast of about 12 in. chord, carefully cambered to give the maximum of streamlining was the main feature. To this, attached by a unique arrangement, was a wishbone hollow boom which had a pulley which came into play when it was necessary to spill wind from the sail, instead of using reefing gear. Handling well and easy to come about even in the rough conditions prevailing this weekend, *FILLY* was a credit to her designer and builder.

D. André Kanssen's neatly folding trimaran was again at Weir Wood this year, with several modifications, one of which was a very useful "forestay" attachment which enabled all shrouds to be fixed before lifting the mast to the upright position. It will be appreciated that this arrangement could be of great assistance to the single-handed rigger and sailor.

E. John Partington's *TABUARIKI* sported two floats this year instead of the single outrigger of previous years. Again, the construction was first class and the finish perfect. Sailing well with her new floats, John's boat was able to go out even in the very roughest moments. I understand that John spent several evenings last week sewing and cutting a new 25 sq. ft. jib to increase his boat's performance but was unable to use it after all due to the shocking conditions and had to be content with his "Storm jib" of about 15 sq. ft.

Martin Sanderson's and John Morwood's 20 ft. Hydrofoil craft was certainly something to stop and look at a second time. Unfortunately, the attachment (feeler) to the front foil was not fixed and the craft wasn't completely ready for trials. Alan Banham volunteered to act as pilot-helmsman. Due to the shallowness at the edge of the

*André Kanssen's Tri.* (*Photo: Anthony Linton.*)

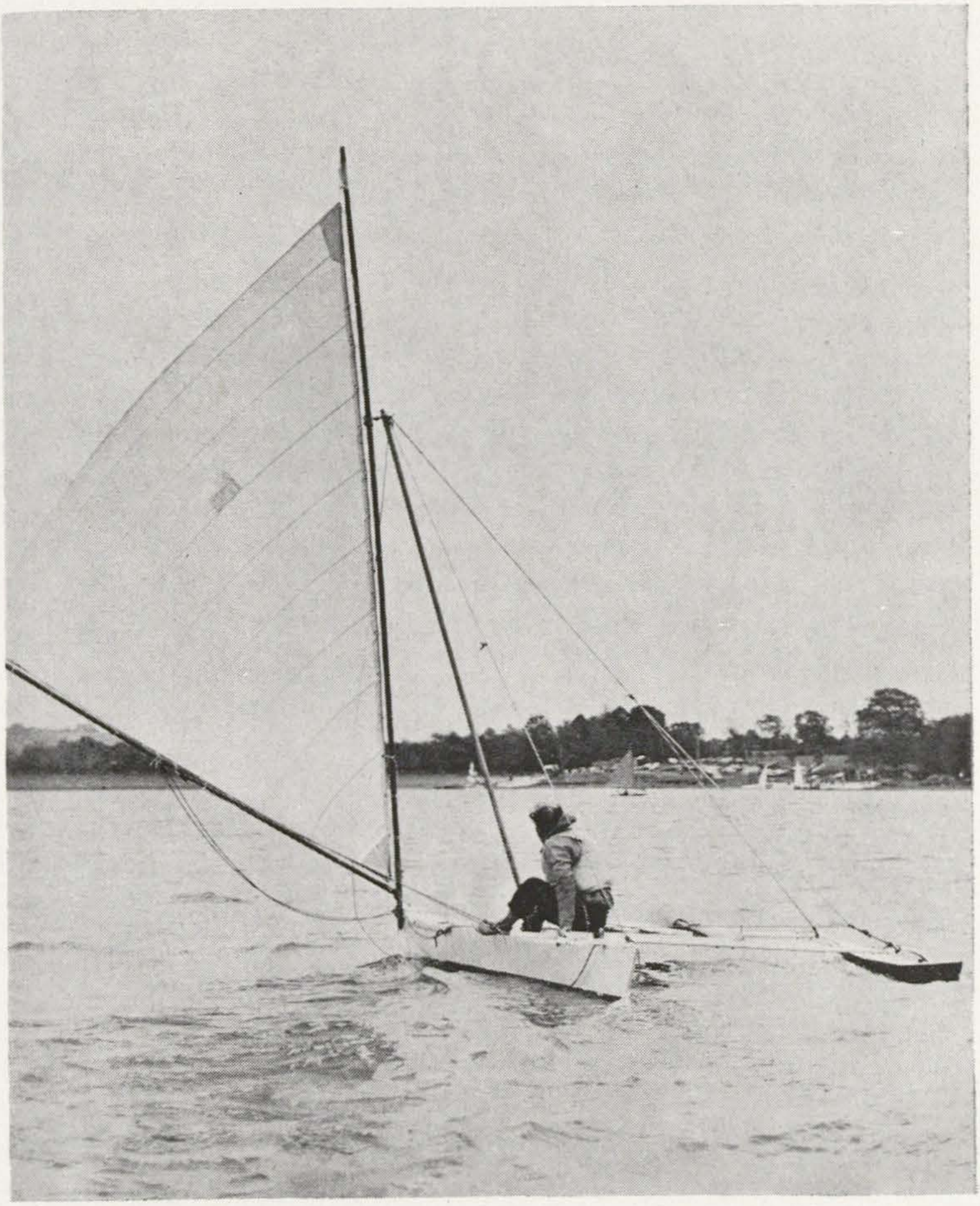
water and the 5 ft. depth of the foils, it was rather difficult to launch the craft. This was eventually accomplished after about half an hour of wading by several brave and cold-water resisting members of the Society.

Then away she went, with Alan perched rather shakily at first but with more stability as she got underway, on top of the cross members. Although the foil incidence and lack of a working front foil

kept her from rising on her foils, at least the craft got to the far side of the reservoir but, when Alan attempted to come about for the return trip, the boat stopped and smartly capsized, thus showing that outrigged buoyancy was very necessary. She turned upside down and, though Alan actually got her sailing again for a moment or two, she was impossible to get upright and sailing again. That was the end of the trial for it required almost an hour to retrieve the craft, during which Alan had to continue swimming and, although he appeared to be enjoying himself, October is not the best time of the year to stay too long in a reservoir. However, when eventually hauled ashore and given a hot mug of cocoa, he remarked that as he was now so wet, the rain didn't matter so he could get some sailing time in and went off with Chris Hughes on (in) his Proa *KIA KIA*.

*James Morwood's TRISCAPH.*

James Morwood's *TRI SCAPH* was certainly a departure from the normal craft (even by A.Y.R.S. standards). Considerable thought and ingenuity must have gone into its construction. The idea appeared good but such were the rough conditions prevailing this weekend that, as was to be expected, the craft did not perform as well as its designer had hoped. However, I give him top marks for perseverance, for it wasn't until late on Saturday evening that I saw him sadly dismounting it and muttering what sounded liked "Ah well—back to the drawing board." Never mind, further modification may make all the difference and we may yet see *TRI SCAPH* on its foils.



*Chris Hughes' PROA.* (*Photo: Anthony Linton*).

Chris Hughes' *KIA KIA* proa sailed long and well in all conditions. It now has a very clever arrangement whereby the ends of the craft are hinged and used as rudders, thus dispensing with the need to manipulate a massive steering oar from end to end, on each tack. Also, Chris now has a very cunning and clever arrangement of pulleys and blocks whereby his "mainsheet" runs from each end of the boat and Chris, continuing to sit in the middle of his craft, simply pulls the yard along the side of *KIA KIA* from end to end of the boat, whenever he wishes to change tack. I'm sure he could make himself a big name in the "Islands" if he ever went there and demonstrated his ideas to the natives. I was amazed at the stability of *KIA KIA* even in some very heavy weather when I went out with Chris. It nearly gave me heart failure though when, instead of the usual custom one has in "Coming up into the wind" and stopping dead near the beach, Chris just continued belting full speed straight up onto the shore each time he came in. "Saves hauling it up" he said as I stepped gingerly onto dry land.

Well, we, who attended this year's meeting (and there were some who came considerable distances, although without their boats), the Gilmores from Northumberland (motor cycle and side car), the Hollings from Yorkshire to mention just two, enjoyed ourselves as only enthusiastic amateurs can; what matter the rain, we had plenty of wind and our boats were really made to perform to the limit of their design. And what is even more important, we met old friends and had lots of fun. One face was missing and that was Fred Benyon-Tinker who was held in Devon by pressure of work but he hopes to have the Brixham A.Y.R.S. group functioning by the time this is published.

Our thanks are due to Roy Pipe for putting up his tent and supplying chairs and a table. This was especially valuable in this rainy meeting.

## THE HOVE MODEL MULTIHULL YACHT RACING GROUP

The A.Y.R.S. welcomes the inauguration of model multihull racing, as described later. Hydrofoils are being allowed and there is every hope that new discoveries will flow fast and furiously from these races, especially if we can feed them with ideas worth trying. We would like their rules to produce models which are scaled-down versions of the full sized yachts which is only a matter of limiting the mast height. We will then be in a position to try out ideas in a way which will be of value at full size.

Races will take place monthly all the year round.

# A MODEL MULTIHULL REGATTA

BY

RAYMOND BLICK

23, Bray Road, Guildford, Surrey

Our inaugural race for model multi-hull yachts was held on the 22nd October, 1967, a week prior to the expected date, resulting in three models not being completed in time.

My own entry *TRICEPHALOUS*, first touched water after dark on the night before the race. In spite of this I had a reasonably easy day, winning with 33 points out of a possible of 35.

I would have liked to say I sailed a Hydrofoil Stabilised Trimaran but in fact I played it safe and built a conventional Tri, for this first event. I wanted to gain experience in this new form of racing without the worry of antics from the machine.

Eight boats turned out, giving seven complete boards in all. This took most of the day, finishing late afternoon. The modellers taking part were all experienced in model racing (5 or so being past or present champions) only myself having studied multihulls at any length (thanks to A.Y.R.S.).

The models, all creations of their owners, were restricted to 36 in. Loa, remaining dimensions being left for individuals to make the most of. Even so there were no "way-out" developments and quite a number had cut their sails with an eye to the wind strength normally found at Hove and found themselves praying for more wind in the morning.

Areas and weight ranged from 230 sq. in., at 2 lbs. to 485 sq. in., on 4.25 lbs. for my Tri which also had maximum beam at 29 in.

By the completion of the second board we were all relieved to find that this type of boat could be raced readily on the tournament system, taking about the same time per board as the Marblehead class models.

Racing continued in a freshening wind (7-10 mph) until 1.0 p.m. with no capsizes on the score card. The superiority of the rounded hulls was becoming apparent. *BATCAT* and *TRICEPHALOUS* had a maximum of 20 points each with *FFRED* only 4 points down. *TABATHA* a scale 'Unicorn' was improving in the middle of the pack after a slow start. I discarded model for camera and took a few static shots for reference having long since given up trying to race and photograph at the same time.


*BATCAT.* (*Photo: Joyce Doughty*).

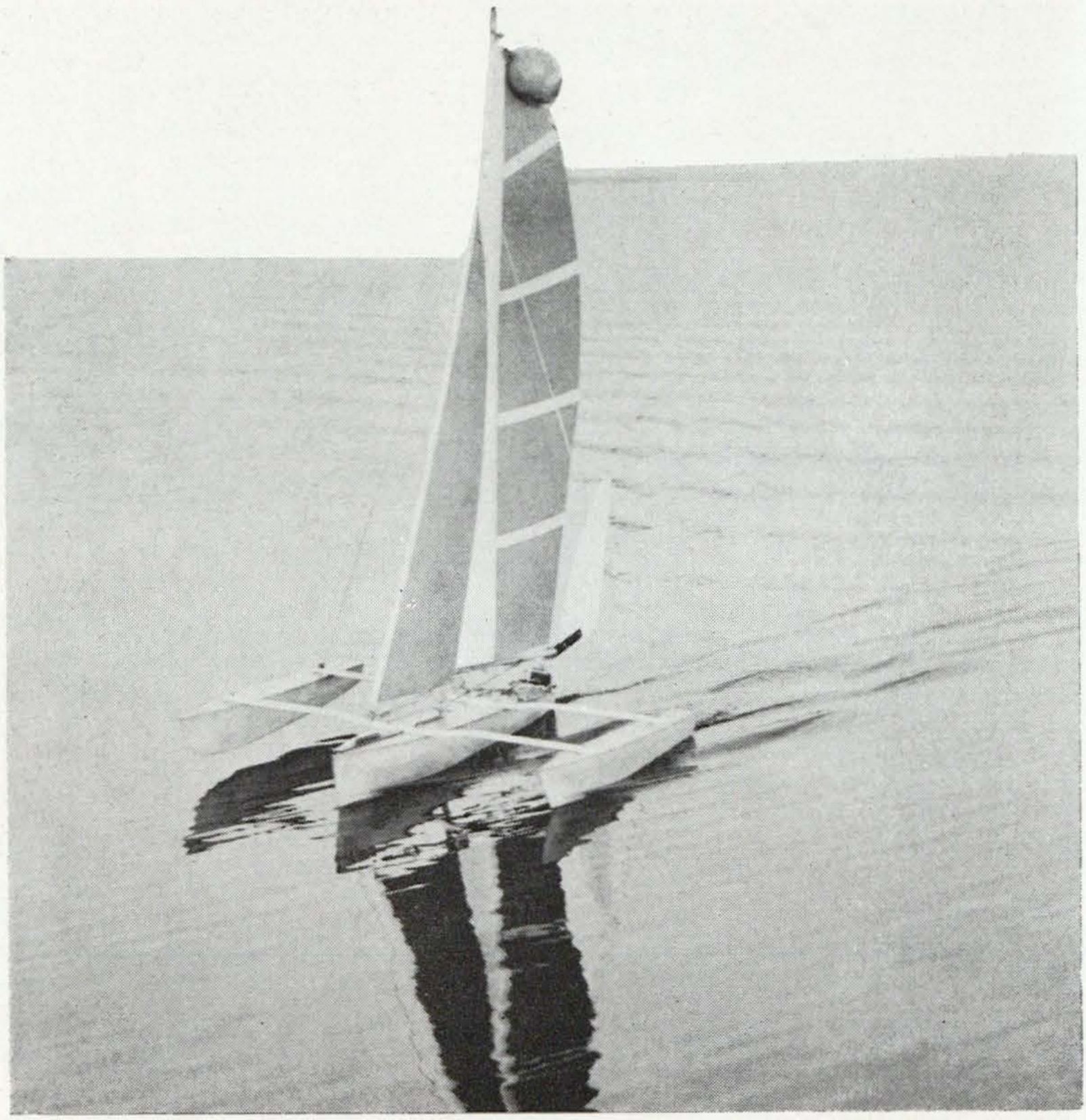
Main lunchtime topic (with beer) was the exciting windward performance in comparison to the disappointing speeds downwind. For the hardened monohull skippers this reversal of speed sensation took a lot of getting used to. Even with a spinnaker of generous proportions acceleration soon levelled out and seemed little affected even by the odd gust.


*FFRED and BATCAT II.* (*Photo: Joyce Doughty*).

While our backs were turned the wind increased to approximately 12 to 15 and livened everything up a bit. The waves started to mount the lee end of the lake wall giving scale size waves more in keeping with open sea sailing. The pace quickened; more spectators appeared. The boats with small sail areas looked a little apprehensive and those with larger areas looked positively precarious, displaying capsizing tendencies.

The flat bottomed rectangle on edge types were the first to flip, mainly through burying the lee bow on the beat and cartwheeling. Not one showed the slightest tendency to go over on the run and large spinnakers where carried throughout.

It was at this stage that *TRICEPHALOUS* lost her only points on the down wind leg against the Catamaran *FFRED* sailed by the

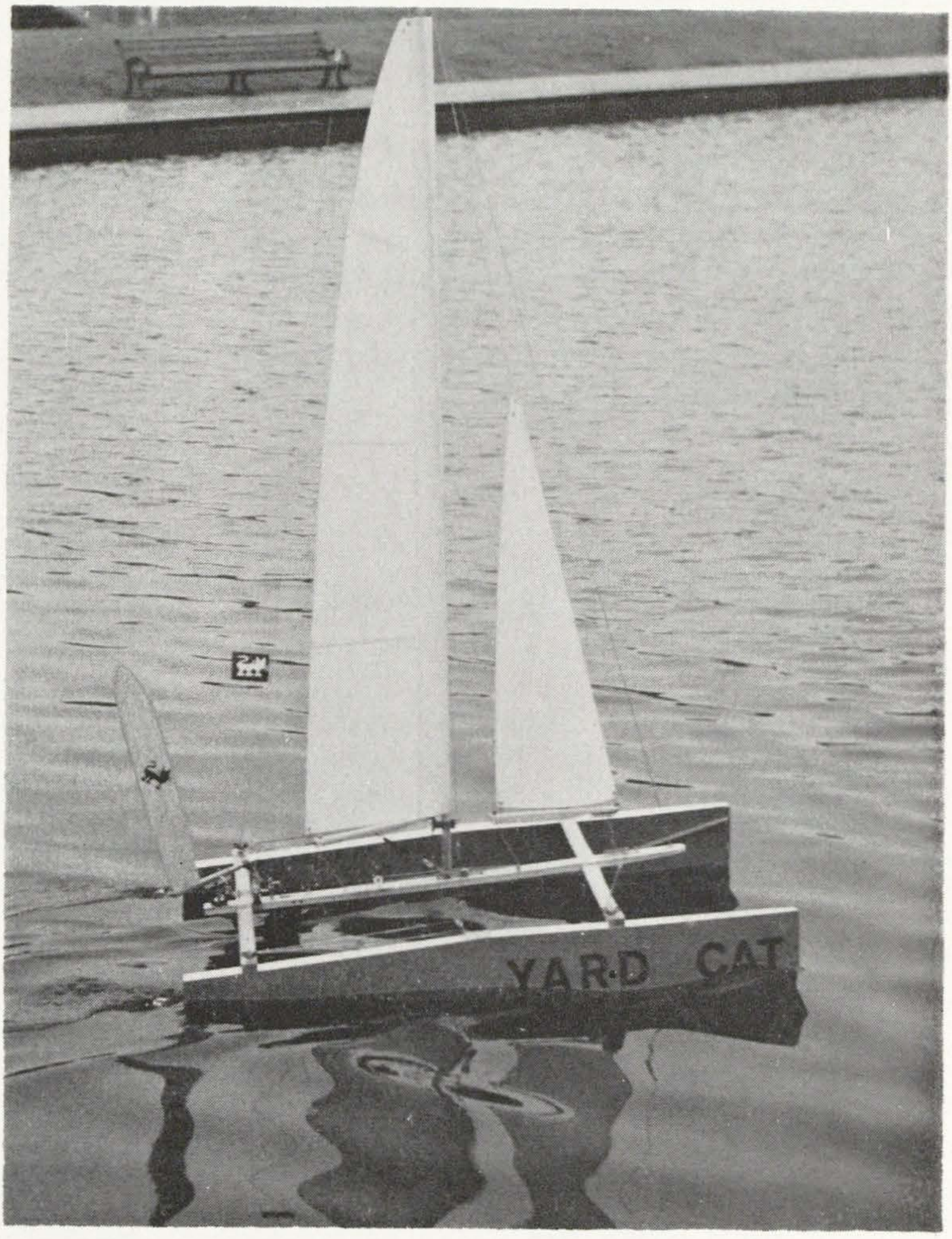


*TRICEPHALOUS.* (*Photo: Joyce Doughty*).

reigning 10 Rater Champ. The Tri was just not fast enough loosing by 15 yards. This was on the third try, the other two had ended with the Tri going out in front and then being run into by the Cat as it built up speed.

In the last race but one *BATCAT* changed down to second suit for the beat. *FFRED*, who had been sailing on a razors edge in the previous beat against the Tri, finally flipped and threw away 3 points to one of the lower placed boats which stayed relatively upright to finish. In this race only 2 cats and the 2 tris finished the board.

Even in the last race with all boats on very much reduced canvass' three Cats went over again and never really looked like making way




*YARDCAT.* (*Photo: Joyce Doughty*).

to windward through being knocked about by the waves. Not so *TRICEPHALOUS* which tore along with spray over the lee float and half the skeg and rudder showing, attacked the waves in a most realistic manner. I should point out that she had sailed all day on the designed second suit, I had left the top suit at home in the rush to get in some practice. This suit was held all day but had I set the top suit it would have been changed before lunch.

All boats set sloop sailplans, about half having luff pockets which enveloped the mast to improve the entry. This is becoming increasingly popular in all the classes of racing models.

Details of boats:—

33 pts. Permanent Lower aspect keel

(1) *TRICEPHALOUS.* Hull semi-circles based on the waterline with 3.25 in. max beam. 1.2 in. rocker. The transom inset .25 in. and immersed 0.5 in. Floats 29 in. Loa 2in. max beam also semi-circles with transom. Shells moulded in glassfibre. Replicas available.

S.A. 485 and 410 sq. in. Weight 4.25 lbs. Fully tacking 15 to 25 ratio moving carriage Vane steering.

27 pts. Centre keel

(2) *BATCAT.* Hulls 2 in. beam formed ply of constant semi-circle for two thirds of length with a carved bow block, spoon type bow with overhang. Transom not in water.

S.A. 460 and 2nd st. Weight 3.5 lbs. Fixed Vane (not self tacking) 22 in. Beam O.A.

21 pts. Lifting centre Plate

(3) *FFRED.* Cat hulls made from foam? 3 in. beam covered with a material? painted over. Generally constant semi-circle carried well up into the bows which are very blunt. S.A. 450 and 2nd. Weight 2.5 lbs. Fully tacking 1 to 1 moving carriage Vane with nylon gears. 28 in. Beam O.A.
CAPSIZED.

17 pts. No keel

(4) *FAUNICAT.* Hulls 6 in. x 1 in. rectangles on end made from balsa strip and sheet with 0.5 in. rounded stem. Hulls only supplied lateral resistance. S.A. 400 and 2nd. Weight 4 lbs. 22 in. Beam O.A. 1.5 to 1. Geared moving carriage Vane.
CAPSIZED (I think) twice.

15 pts. No keel

(5) *YARDCAT.* Exact design as for Faunicat except that Weight 3.5 lbs. and only fixed Vane used with tacking stops extra manually operated. CAPSIZED.

11 pts. Lifting centre Plate. Also 8 ozs. sliding ballast

(6) *TABATHA.* Cat Hulls based on the 'A' class Unicorn and made from developed ply in the Mazzotti tradition. Hull Beam 1.5 in. The only 'scale model in the fleet, quite fast mid morning but lacked reserve buoyancy for stronger winds. 2 to 1 nylon geared moving carriage Vane with self tacking. S.A. 230 sq. in. Weight 2 lbs. 20 in. Beam O.A.

10 pts. Centre Dagger plate

(7) *TRY ONE.* The only other Tri racing. Hull flat bottomed 'V' 3 in. Beam. Floats similar 2 in. Beam. All three hulls are weight bearing. Balsa construction throughout.

*TRY ONE.* Balantine type broken linkage Vane in brass with geared pick-up to rudder giving 2 to 1 ratio. Weight 2.5 lbs. S.A. 300 sq. in. NO 2nd suits. 24 in. Beam O.A. The Vane was an old one transferred from a Mono' suffered from sticking and was not corrected until after lunch when boat performed well. Only had one suit of sails but was one of four which did not capsize.

4 pts.

(8) *HEPCAT.* Hulls inverted 'V' 1.5 in. at lower surface and 0.75 in. at deck. All balsa construction. S.A. 390 sq. in. No 2nd. Weight 3.5 lbs. 18 in. Beam O.A. Details of Vane not known.

Although only making 4 points this model with a beam of only 18 in. and a sail area of 390 sq. in., at a weight of 3.5 lbs. was one of the 4 which did not capsize. It was fitted with two quite large dagger plates, pointed very high indeed but took three times longer to beat the length of the lake. In the afternoon the plates were removed with startling improvement in speed and still pointing quite high. Obviously suffered from an overdose of skin friction with the plates in. This boat beat *FFRED* on the run to take 2 points. *FFRED* was the only boat to beat *TRICEPHALOUS* on the run.

Although the three leading boats carried the largest sail areas, it was obvious that by the third board the others had all the sail they could handle.

*BATCAT* has been sailing since before Easter this year but even though being in excellent trim still did not have the directional stability of the Trimaran. Also the Tri made more use of the gusts when beating and although pointing higher than most (judging by contact points at the bank side) she resisted all tendencies to be headed.

In Conclusion:—Class model multihull racing is here to stay. This event raised far more spectator interest than even a monohull National Championships.

(2) Due to their lightweight they are less tiring to sail. No carrying 20 to 40 lbs. of boat the length of the lake for a resail. Little chance of torn hands when stopping the down hill flight of a monster. (I have had a 10 rater go through my hand).

(3) The development possibilities are limitless, embracing all the different configurations in equal competition. 36 in. L.O.A. ties in with the A.Y.R.S. design competitions and could provide excellent comparisons of efficiency. Model monohulls never really approach the sailing habits of the real thing, but I was very impressed with the similar characteristics of these models with multihulls I have seen sailing.

(4) The Model Yachting Association is being approached with a view to recognition as a class. Also the Metropolitan & Southern District Committee to transfer the Trophy for the now defunct 36 in. restricted class over to a multihull championship event. (Expect fanatical opposition from the semi retired old guard).

(5) The results of this first race confirm the A.Y.R.S. conclusion that the Tri would be a better model. In fact the whole effort proved nothing which is not already known to A.Y.R.S. members.

(6) Finally, we have arranged a second race to be held at *Hove Lagoon* on Sunday, 3rd December, 1967. Three boats which missed this race will be complete, F. Shepherd is building a new boat, his wife will probably sail the *BATCAT*, *YARDCAT'S* bow has been modified C. Dicks (*FFRED*) had a very thoughful look in his eye when he left. A cat using two main hulls from my mould of the Tri is in the hands of another club member and well under way.

I would like to try something like the Bouyant Triple Hydrofoil (A.Y.R.S. 62) or similar.

*ED.*—Ray Blick will sell hulls and floats to members at the following prices: Main hulls £1 18s. 0d. each. Two could be used as a catamaran. Floats per pair £2 17s. 0d. Hulls and floats are of excellent designs and beautifully moulded in fibreglass. Ray also sells Marbleheads and other single hulled models.

Dear John,

Ray Blick's talk on the use of models was first rate and, as it followed so soon after the publication on hydrofoils, the timing was perfect. The use of models which can be sailed together and have their performances measured, recorded and evaluated would save a fantastic amount of time and money. Many members have not the time or facilities to develop full size experiments but would be able to manage the odd model and this would help to produce new ideas for development into full size by those who have the means.

The following points occurred to me later:—

1. *Size:* Ray Blick gave 3 ft. L.O.A. as the size his club has worked to, mainly because of the speeds reached by multihull models. In the case of multihull cruisers, this is a good size, not so much because of their speed but rather ease of transporting beamy boats which cannot be dismantled. This size also fits in with the A.Y.R.S. model cruiser rules. The speed problem should really be taken care of by experienced helpers.

In the case of models which could be dismantled, as the full sized boats would be, i.e., racing multihulls and flying foil craft, I think 5 or 6 ft. L.O.A. would be a better length to work to. This would help to reduce scale effect and give more opportunity to fit measuring instruments, control gear etc.

2. *Rules:* These should be kept as simple as possible to allow freedom for experiment and development. Length, beam, sail area and scale weight to represent crew and equipment should be sufficient. As Ray Blick explained, mast head buoyancy is a basic requirement for the recovery of models.

3. *Classes:* Perhaps in addition to the existing A.Y.R.S. cruiser class others could be added—a class to measure the fastest speed (with or without Hydrofoil assistance) of

(a) Any type of multi-hull and

(b) Any type of Mono-hull and

(c) Any type of flying foil craft.

The high standard of the fibre-glass models Ray Blick brought along to the meeting reminded me of an idea discussed with Tom Herbert—that the A.Y.R.S. should have its own one design hull's, as identical to each other as possible, so that members could add their own sail designs to them to measure sail performance only. A stage further would be to have standard A.Y.R.S. sails which members could set on hulls of their own design to assess hull shapes.

4. *Outdoor Meetings:* At the moment we have Weirwood for full size boats in the Autumn and the Round Pond for models in Mid-winter. Perhaps two more meetings could be held for models, say Spring and Summer, to be held at different locations to share out the travelling involved.

5. *Publications:* In the same way as one publication was devoted to Self Steering Gear another one dealing with making and using models for research (by members such as Bruce, Lewis, Hogg, Blick, Col. Bowden, etc.) could be very useful.

It would also be very useful if a publication would contain a set of charts giving scale weight, water speed and wind speed, etc. in ready reckoner format.

RON DOUGHTY.

17, Devonport Road, Shepherd's Bush, London, W.12.

## THE MULTIHULL CAPSIZE

BY

THE A.Y.R.S.

Written up by JOHN MORWOOD

On October 3rd, 1967, we had a most successful meeting on the "Multihull Capsize" which may lead to a better understanding of the whole matter. After such a meeting, it is hard to remember who said what and obviously some ideas were produced actually *by* the meeting where several people were responsible. The principle speakers were:—

Bill Howell, Roland Prout, Michael Gilkes, James Wharram, Robin Chaworth-Musters, Michael Butterfield, Michael Ellison and Jock Burrough.

Bill Howell opened the meeting by describing his capsize in *GOLDEN COCKEREL* and discussed how it could have been avoided. The meeting had been planned to distinguish between catamaran and trimaran capsizes but the speakers all thought the principles were the

same for both. The content of the meeting can be divided into the following headings:—1. Handling; 2. Design; 3. Mathematics; 4. Behaviour after capsize.

1. *Handling.* The question here was what to do when caught with an overcanvassed multihull in a too-strong wind. The procedures advised were often contradictory when the weather hull of a catamaran begins to lift or a trimaran becomes too hard pressed but here they are:

(a) Release the main sheet—this immediately takes off about half the heeling force even with a large Genoa. All sheets should be on jamb cleats with the loose ends free to run out without snagging.

(b) Release the Genoa sheet.

(c) If close hauled, luff up.

(d) If close reaching-about 6 points from the true wind-bear away. There was some confusion of advice here because of the contrary actions "Transitions point," which was expressed by everyone agreeing that the close reach at 6 points from the wind was the most dangerous point. Michael Gilkes suggested that failure to luff even on this course seemed to be the cause of the knock down of the ballasted *MISTY MILLER.* Everyone else seemed to prefer bearing away.

(e) Bill Howell seemed to infer that, when shortening sail for an increase in wind strength, one should lower the Genoa completely before hoisting the smaller sail even (possibly especially) when racing.

2. *Design.* James Wharram said, among general consent from the sailors, that catamarans are fairly safe if designed so as not to capsize in less than a force 7 wind with full sail. He pointed out that force 5 is a nice sailing breeze where no one would think of reefing but force 6 can come during a force 5 so quickly that a multihull may find itself in trouble. Rather over-emphasizing the point, he said that catamarans designed to capsize in force 6 will "kill people." If designed to capsize in force 7, the wind and sea will cause people to take action in plenty of time.

The actual design of multihulls which makes for the greatest immunity from capsize was not discussed in much detail. James Wharram stressed the advantage of a low centre of gravity which he gets by having no bridge-deck cabin and delay in the "point of no return" which he gets by having flared topsides. Roland Prout made the point that deep hulls have a centre of buoyancy which moves to weather when a hull lifts, thus reducing effective beam whereas his shallow hulls have a centre of buoyancy which moves to leeward when a hull lifts.

3. *Mathematics.* The critical point of stability of catamarans (and trimarans which have floats which can lift the entire craft) is found by the formula:—

$$\frac{\text{Sail area x Height of C. of E.}}{\text{Weight x Half-Beam to C. of B.}}$$

James Wharram's wife Ruth has worked this figure out for many catamarans and judges their safety by the figure found. John Morwood thought that the formula:—

$$\frac{\text{Sail area}}{\text{Weight x Beam}}$$

would work equally well, even though the ketch rig, for example, would have less heeling moment. Using this formula, the Prout Sea Ranger has a figure of 7, which is phenominally safe; the Prout 27 foot catamaran cruiser and *GOLDEN COCKEREL* have figures of 14 and 15 respectively and both can be capsized with some difficulty. *MISTY MILLER* and *IROQUOIS* with figures of 20 and 21 are both capsizeable in force 6. All these figures have been worked out with full sail area and are of a better size to remember than those of the more accurate formula and will not be far different in relative values.

4. *Behaviour After Capsize.* Multihulls without mast-head buoyancy turn upside down and generally need outside help to right them. When there is mast-head buoyancy, the mast stays to leeward and is pressed down into the water by the wind pressure of the wind on the bridge-deck. This was most clearly described by both Roland Prout and Michael Gilkes. The only way suggested to get the mast to windward was to hoist a small sea anchor to the mast-head, with possibly another to the bow or stern.

The phenomenon of the mast-head float staying to leeward aroused interest. According to Raymond Blick, this does not appear when there is no bridge deck and is due to the windage of the underside of the platform moving its centre of pressure towards the leading edge when the hull slews.

*Known Capsizes.* We have made no systematic search for either catamaran or trimaran capsizes up to now but surely we should now publish capsizes of all multihulls when members tell us about them. Fortunately, with our world-wide membership, there should be no trouble in getting to know of each capsize and the nature of the circumstances which caused it. We must, of course, exclude deliberate capsizes which designers undertake to test their designs from our list.

*Catamaran Capsizes.* *GOLDEN COCKEREL*, *ALLEZ CAT*, *HARRIS* 37, *IROQUOIS* (2), is a starting list which is far from complete. I have heard of some others but don't know the names of the boats.

*Trimaran Capsizes.* These are relatively few considering the numbers sailing and often by newcomers to yachting. Following Arthur Piver's lead, trimarans are seldom overcanvassed and Piver's atest floats are large enough to support the whole weight of the craft.

1. *NUGGET* off Salcombe—capsized when crossing Salcombe bar—A.Y.R.S.
2. *NUGGET* off Cape Town—A.Y.R.S.
3. *NIMBLE* near Ipswich.

   (*VAGABOND* near Manly, Australia—designer's trial).
4. *VAGABOND* lost, East Australian Coast—not necessarily a capsize.
5. *PRIVATEER* lost with Hedly Nicol aboard—not necessarily a capsize.
6. *BANDERSNATCH* lost (Crowther design)—not necessarily a capsize.
7. Two Hartley trimarans off Sydney, Australia—*SPARKLES.*
9. *NINKA* in Great Lakes—A.Y.R.S.
10 and 11. Rumour of two Piver designs which capsized on American West Coast.
12. *TRIUNE* in Poole Harbour.

This is a relatively small list, considering all the trimarans sailing.

*Conclusion.* The conclusion of the meeting was that all multihulls had to be sailed with care and good seamanship. This seamanship was being accumulated at present and, when it had grown to reasonable proportions, capsizes in large cruising multihulls should no longer take place.

## CATAMARAN STABILITY FORMULAE

BY

MIKE BUTTERFIELD

Thatched House, Fairmile Avenue, Cobham, Surrey

It is with trepidation that I risk criticising a formula from so eminent an authority as John Morwood but I believe most of the

speakers at the October meeting were also unable to support this particular formula. He admits that it may be an over simplification of the Wharram formula but does not think that on this matter it produces any significant difference.

But surely a formula which takes no account of hull shape, no account of windage, no account of where the centre of effort of the sail plan lies, no account of where the centre of gravity lies nor even whether the hull is ballasted or not, is not merely simplified but is totally misleading?

Applying the formula to say *PELICAN* and *MIRROR CAT* one would get a result which suggested that because *PELICAN* displaces over twice the tonnage of *MIRROR CAT* whilst having very similar beam and overall sail area measurements she must therefore be appreciably more stable. Anyone who has seen these two boats in testing conditions will realise the fallacy.

John Morwood quotes as an example of the working of his formula that the respective stability of an *IROQUOIS* and *MISTY MILLER* are almost the same.

I am a keen fan of *IROQUOIS* and think they are excellent boats but they were designed to fulfil a different function to that of *MISTY MILLER.* Anyone who has sailed on both these boats, I believe, would agree, that their respective stabilities are not similar. Apart from gibing, the mainsheet is never held in the hand on *MISTY MILLER* no matter what the wind conditions.

# MULTIHULL STABILITY

## A.Y.R.S. Formula

BY

Robin Musters

New Quay Road, Poole, Dorset

However much the pure mathematician and designer may dislike such over simplification, it is possible to have a rule of thumb guide to multihull yachts stability. To avoid arriving at an answer which exaggerates the actual stability at sea, it is advisable to include point nine in the expression

$$\frac{.9W \times b/2}{S} \text{ ft. lbs. per sq. ft.}$$

where,

W = displacement in pounds in sailing trim

b = beam in feet between the centrelines of the outer hulls. (i.e. b/2 = horizontal distance from the centre of gravity to the centre of buoyancy of the leeward hull).

S = Rated sail area in square feet.

It is important that the same measurement of sail area is used for each boat compared, as a boat provided with sails for use in light airs is no less stable under her appropriate sails in fresh winds on that account.

The 'working' sail area is largely a matter of opinion, the rated sail area is measured in a standard manner and is approximately the total profile area of the sail plan (i.e. the area presented to the wind when broadside on), which will do just as well.

While the figures are at hand and your slide rule is poised, another significant ratio is the Power to Weight Ratio,

$$\frac{\text{Displacement in sailing trim (W)}}{\text{Rated Sail Area (S)}}$$

which together with the hull form, gives an indication of the performance to be expected.

Both these ratios can be expressed in metric units as follows.

Stability Ratio $\dfrac{.9W \times b/2}{S}$ m. kg./m²

Power to Weight Ratio $\dfrac{W}{S}$ kg./m²

## THE MULTIHULL CAPSIZE

Dear John,

Many thanks for the most informative evening on multihull sailing.

As you know I was not a speaker but could not resist making a comment during the meeting.

What I wanted to say was that to give pleasure and be fully seaworthy every multihull ought to be able to sail in handicap races to improve the owner's experience and seamanship. This calls for enough sail for a wind of force 3. With our present rigs this is too much sail for force 6 (9 and 24 knots).

I would like to add that almost every vessel spends much longer in port than at sea and the extra room and comfort of a multihull at anchor is worth a lot of extra care at sea.

From the meeting, a very major fact, which I had not fully realized before, came out. This is the capsizing effect of a deep keel or lowered centreplate or plate keel. J. Wharram had said at his talk last season that this was an advantage of his design and Prout and *MISTY MILLER* with her shortened keel now prove this. (*MISTY* capsized *with* her self righting keels and weights, not after they were removed. My wife and I helped to sail her home from U.S.A. in 1966 without keels and would be happy to repeat the voyage). During the Round Britain race with *IROQUOIS* when sailing with a beam wind I always raised the lee side keel plate. At the time we were deliberately carrying all possible sail (sheets in hand via jamb cleat) and it now seems this was an important factor.

I have written a hand book on how to sail the *IROQUOIS* (for Sailcraft) to try and prevent any further capsize. This goes to every owner. I mentioned lee side plate but will now stress this.

R. M. ELLISON.

The Old Cottage, Hermitage, Newbury, Berks.

Dear John,

Thank you for sending the copy of the 'write up' of the meeting. I found it very interesting and wished I could have stayed to the end. As it was we arrived back very late and only just in time to catch the tide out of our Creek in *OCEAN HIGHLANDER*.

We had a good sail in strong winds but did not go to Ostend due to persistent force 9 to 10 gale forecasts. We did however sail out towards Galloper in the Thames Estuary in a force 7 and then back to Ramsgate for the night. The boat behaved beautifully, and on the broad reaches we were able to carry full main and Genoa without over pressing the boat. Our maximum speeds were 15 to 16 knots.

I have no particular comments on what you have written which fairly well covers what was said. I would point out however that there is no confusion in my mind about whether one should bear away or luff in event of a Cat being over pressed. There is a time when bearing away is best and a time when it could be dangerous. I feel that any experienced small Cat sailor will know which move to take which depends on a number of factors. One thing is certain however, that if one is sailing in a wind strong enough so that the sails must be eased

slightly most of the time to keep the hull down, then in event of a hull lift it would be dangerous to bear away, for if by bearing away the hull did not return safely to the water the situation could be made worse temporarily, especially if it becomes necessary to ease sheets after a bearing away.

Of course if in event of a high hull lift and when sheets have been released a little too late and the Cat continues to be over on her ear with flapping sails, the rule is to always bear away sharply in order to use centrifugal force to bring the hull down again, but sheets must be well off for this move to be safe.

ROLAND PROUT.

The Point, Canvey Island, Essex.

*James Wharram's Remarks at the A.Y.R.S. Meeting on Multihull Capsizing on October 3rd.*

Jim Wharram was in his usual controversial form. He said:

"To me it seems clear that we can have stable multihulls, with capsizes as rare events (as on Barges, Dutch Scows, and American Sharpie's), by having a sail rig in proportion to the hull stability.

"Experience shows that multihulls which have a minimum stability range from about force 8-9, are reefed round about force 7, and so do not capsize in the gusts.

"Experience also shows that multihulls under the influence of racing are accepting lower minimum stability standards—force 5-6. These designs are capsizing in gusts unless sailed by highly skilled crews.

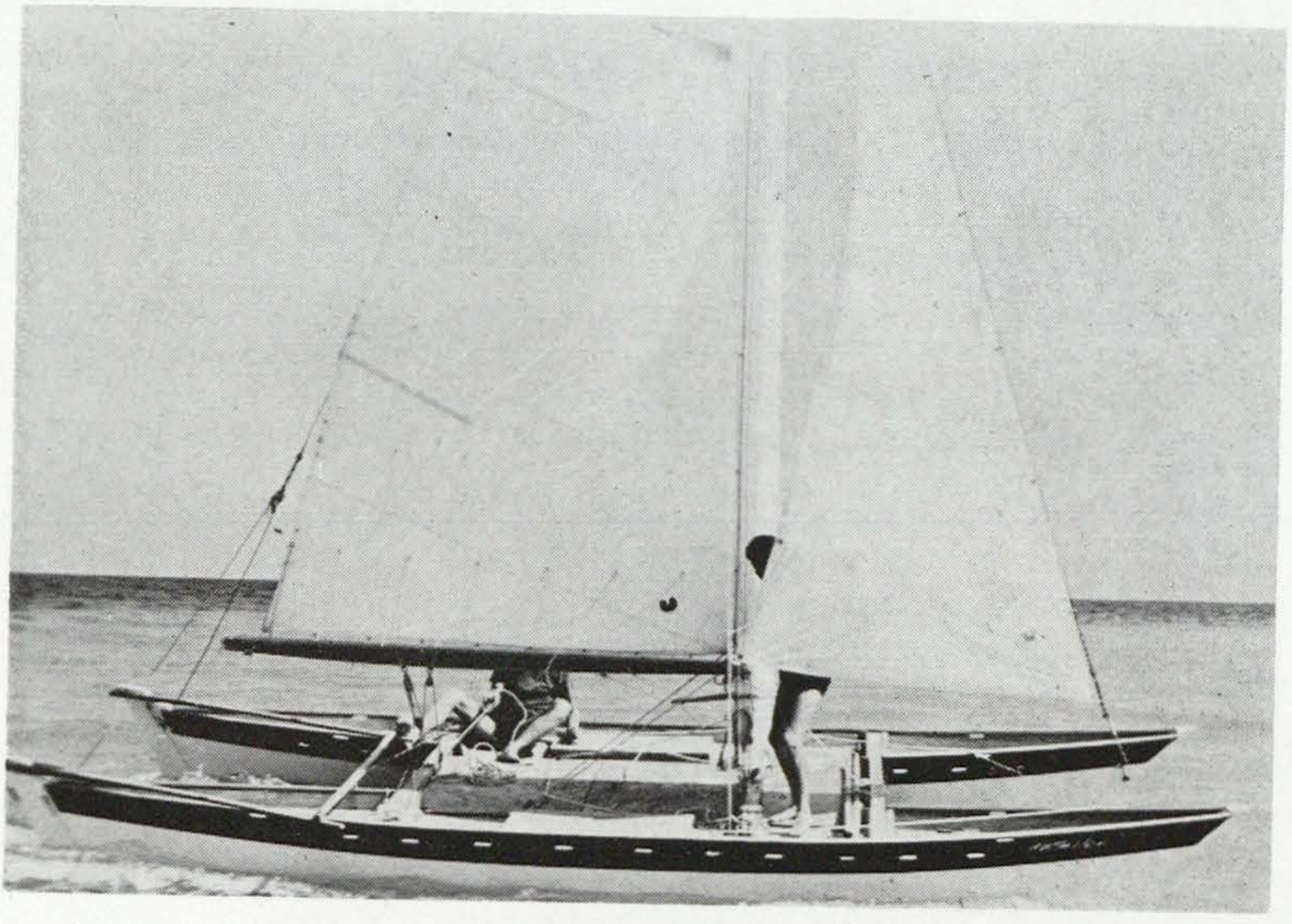
"We either accept that multihull sailing is safe only for highly skilled sailors, with a battery of jamb cleats and quick release gears, or we accept that anyone can sail a multihull.

"He then criticised the various Multihull Rating Rules in the World for not being clear in their intentions:—were they trying to encourage highly expensive racing multihulls, stable only when sailed by skilled crews, that would, he said, echoing a remark earlier by Bill Howell, be killer ships in the hands of the inexpert, or were they attempting to produce safe, offshore multihulls suitable for the average sailor?

"He urged A.Y.R.S. members to discuss and clarify minimum accepted standards of stability in multihull design, and to give a lead to the general public.

"Later, in the mathematical section of design, Wharram gave his private theories on how to obtain better multihull stability. He argued that high topsides and large deck cabins raise the centre of gravity and reduce stability. For this reason he does not design catamarans with a large deck cabin. However, he did pay tribute to the stable Bill O'Brien catamarans and the Prout *SEA RANGER*, producing figures to show that these designs are stable in a wind force 8-9, in spite of the deck cabin. Though, with a lower centre of hull gravity, Wharram pointed out that a multihull could safely carry more sail area for increased speed.

"He showed pictures of one of his 22 ft. *HINA* designs (Bermudan rigged) sailing with the crew wandering around the lee hull and tentatively advanced the theory that the flared Veed hull cross-section which



he favours, produces "hydrostatic stability." in that the lee hull sinks, when the boat is hit by a gust of wind, without the weather hull lifting. As it sinks, the pressure of the water builds up under the flare of the lee hull, and exerts a counter force to the capsizing force. Indirect evidence, suggesting that there may be something in this theory came from Roland Prout, who claimed his boats showed less signs of stability when the hulls were "dirty with barnacles," which, in turn, suggests that "total stability," can, once the basic stability calculations are worked out, be increased by minor modifications in hull shape. Wharram argued again, as he has always argued, that "shallow draft"

of the Veed hull as against the deep draft of the early ballast keel catamarans, or deep centreboard catamarans gave more "total sea stability." Again, Roland Prout confirmed this by describing how he has dropped centreboards in favour of skeg keels in his cruising designs and a particular direct comparison was in his A Class *BAMBI*, (which, with its overhangs and aft skeg, resembles Wharram's Polynesian hulls). *BAMBI*, Prout declared, was more stable than his similar sized designs using a centreboard!

"Apart from a disagreement on which way the centre of gravity moves on a Veed Polynesian hull, between Wharram and Prout, it was remarkable how these two experienced designers were confirming each others theories on achieving maximum hull stability."

Dear John,

Thank you for your text of the write-up of the meeting of 3rd October. Seems okay by me, and emphasises the right points. I'm not quite sure how Roland Prout makes out that deep hulls have a centre of buoyancy which moves to weather when a hull lifts, while shallow hulls have a centre of buoyancy which moves to leeward. Perhaps Roland will clarify that point when he replies to your circular.

My final conclusion after capsizing the *COCKEREL* (it's spelt with one L, not double L) would really be that multihulls had to be sailed with *extra* care and *better than average* good seamanship.

Sincerely,

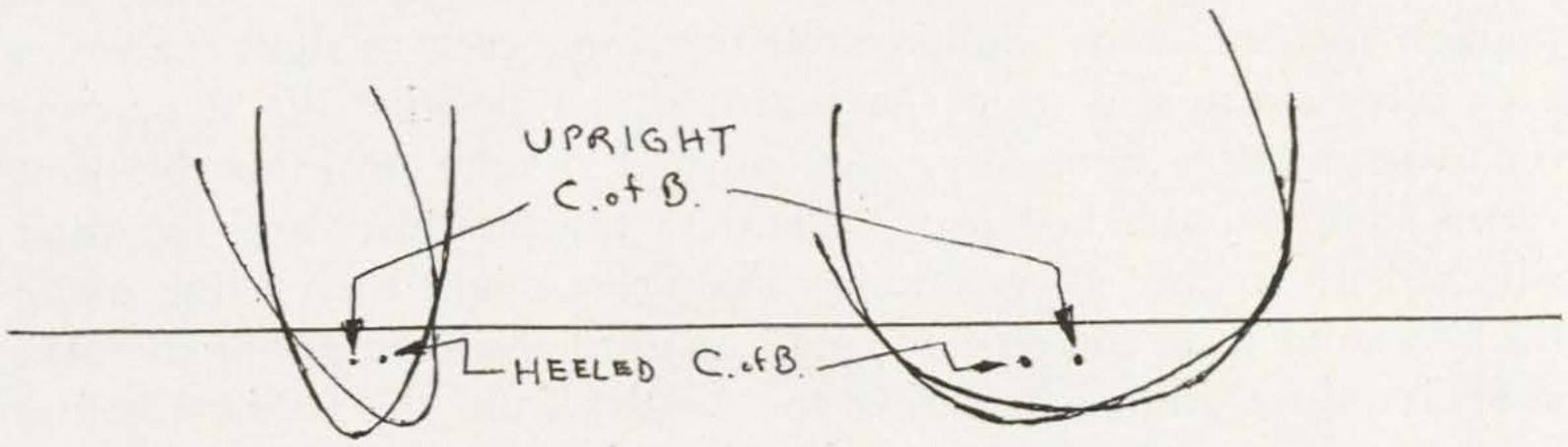
BILL HOWELL.

91a, The Broadway, Wimbledon, S.W.19.

Dear Bill,

Many thanks for your note.

Roland's point can best be explained by a diagram thus:—




JOHN MORWOOD.

# SUGGESTIONS FOR THE SHTAR CAPSIZING—SAFETY ARRANGEMENTS

BY

JOCK BURROUGH

44, Bedford Gardens, London, W.8.

Any vessel entered which when heeled to 90° has little or no righting moment should have arrangements which will provide for:—

Survival at Capsize.

Survival after Capsize.

Righting the vessel and sailing on.

1. *Survival at Capsize*

(a) Escape if trapped inside a hull. An exhausted and/or injured crew would find it hazardous to dive under and out particularly with sheets and gear obstructing the exit and at night. An escape hatch which would be above the water line when capsized is recommended, although this might cause the vessel to fill more, it is assumed that there would be sufficient positive buoyancy built in to prevent foundering. In the case of a catamaran the flooding of one hull might be of assistance in 3 below.

(b) Escape if trapped underneath inverted cockpit, deck, wing or netting. Safety harness must have a release attachment at the harness end in addition to the clip on end.

2. *Survival after Capsize*

Hand holds and/or safety line to be fitted in the inverted position. Escape Hatch recommended in 1 above to be openable from outside to give access to food, water, pyrotechnics etc. Life raft to be accessable and operable from the inverted position.

3. *Righting Vessel and Sailing on*

The flooding of one hull will assist, but in an off shore vessel it is unlikely that this alone would enable the single crew to right the vessel even after storm conditions have abated. A positive lift at or near the mast head is necessary. An inflated dinghy or other buoyant vessel could be attached to a halliard to the masthead and the mast winched up to the 90° position. The crew might then climb along the horizontal mast and push the mast up until positive righting moment is achieved, of course, releasing the dinghy from the halliard before hand, unless he is desirous of inspecting his mast head in the normal position without a bosun's chair!

# THE AMATEUR YACHT RE

## INCOME AND EXPENDITURE ACCOUNT F

| | £ s. d. | £ s. d. |
|---|---|---|
| Cost of Publications: | | |
| Opening Stock | 1,076 12 7 | |
| Printing Costs and Blocks | 2,454 19 0 | |
| | 3,531 11 7 | |
| *Less:* Closing Stock | 1,277 15 10 | |
| | | 2,253 15 9 |
| Rent of Office | | 52 0 0 |
| Salaries | | 52 0 0 |
| Travelling Expenses | | 19 0 6 |
| Printing, Stationery and Telephone | | 74 2 8 |
| Postage and Carriage | | 582 8 9 |
| Secretarial | | 157 13 8 |
| Advertising | | 21 18 4 |
| Hire of Rooms etc. for Meetings | | 76 10 9 |
| Special Meeting | | 57 4 0 |
| Expenses of Stand at Boat Show | | 244 7 5 |
| Subscriptions | | 12 0 0 |
| Rent of Reservoir | | 20 0 0 |
| Insurances | | 1 19 6 |
| Sundry Expenses | | 12 8 1 |
| Audit and Accountancy | | 26 5 0 |
| Bank Charges and Cheque Books | | 8 6 4 |
| Model Yacht Competition Expenses | | 80 0 0 |
| Films and Tapes | | 14 6 |
| Heat and Light | | 15 7 10 |
| Depreciation: | | |
| Wind Tunnel | 50 0 0 | |
| Building | 29 13 6 | |
| Office Equipment | 7 6 8 | |
| Fixtures and Fittings | 9 7 3 | |
| | | 96 7 5 |
| Excess of Income over Expenditure for the Year carried down | | 217 7 2 |
| | | £4,081 17 8 |
| Balance carried forward | | 2,851 8 11 |
| | | £2,851 8 11 |

## BALANCE SHEET AS AT

| | £ s. d. | £ s. d. |
|---|---|---|
| ACCUMULATED FUND | | 2,851 8 11 |
| AMERICAN SECTION FUND | | 286 13 4 |
| CURRENT LIABILITIES | | |
| Creditors | 2,165 2 3 | |
| Subscriptions in Advance | 71 17 6 | |
| | | 2,236 19 9 |
| | | £5,375 2 0 |

## REPORT OF THE AUDITOR TO THE MEMBERS OF T

I have examined the above Balance Sheet of The Amateur Yacht Research Society Limited as at 30th
obtained all the information and explanations which, to the best of our knowledge and belief, were necessary fo
account have been kept by the Company and the above Balance Sheet and annexed Income and Expenditure Ac

Further, in my opinion and to the best of my information and accord'ng to the explanation given to me
Balance Sheet and Income and Expenditure Account give, respectively, a true and fair view of the state of the Co

174, New Bond Street, London, W.1.
29th November, 1967.

# SEARCH SOCIETY LIMITED

**FOR THE YEAR ENDED 30th SEPTEMBER 1967**

| | £ | s. | d. |
|---|---|---|---|
| Subscriptions received | 2,158 | 18 | 9 |
| Proceeds of Outside Sales of Publications | 1,616 | 3 | 2 |
| Surplus on Sale of Ties and Burgees | 60 | 9 | 6 |
| Income from Advertisements | 120 | 9 | 4 |
| Interest Receivable | 67 | 11 | 7 |
| Income from Meetings | 42 | 9 | 1 |
| Donations | 15 | 16 | 3 |
| | £4,081 | 17 | 8 |
| Balance brought down | 217 | 7 | 2 |
| Balance brought forward from previous year | 2,634 | 1 | 9 |
| | £2,851 | 8 | 11 |

**30th SEPTEMBER 1967**

| | Cost | | | Depreciation to Date | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| FIXED ASSETS | £ | s. | d. | £ | s. | d. | £ | s. | d. |
| Building | 209 | 13 | 6 | 29 | 13 | 6 | 180 | 0 | 0 |
| Wind Tunnel and Test Equipment | 250 | 0 | 0 | 100 | 0 | 0 | 150 | 0 | 0 |
| Office Equipment | 58 | 13 | 3 | 35 | 13 | 3 | 23 | 0 | 0 |
| Fixtures and Fittings | 74 | 18 | 0 | 16 | 8 | 3 | 58 | 9 | 9 |
| | £593 | 4 | 9 | £181 | 15 | 0 | £411 | 9 | 9 |
| CURRENT ASSETS | | | | | | | | | |
| Stock of Publications and Ties as valued by Company Officials | | | | 1,381 | 9 | 3 | | | |
| Debtors and Prepayments | | | | 273 | 0 | 4 | | | |
| Cash at Bank | | | | 3,045 | 7 | 11 | | | |
| Cash in Hand | | | | 263 | 14 | 9 | | | |
| | | | | | | | 4,963 | 12 | 3 |
| | | | | | | | £5,375 | 2 | 0 |

**THE AMATEUR YACHT RESEARCH SOCIETY LIMITED**

September 1967 and the annexed Income and Expenditure Account for the year ended on that date, and have r the purposes of our audit. In my opinion and so far as appears from my examination thereof, proper books of count are in agreement therewith.

, the said accounts give the information required by the Companies Act in the manner thereby required, and the mpany's affairs as at 30th September 1967 and of the results for the year ended on that date.

R. A. BOWMAN (*Signed*)
*Certified Accountant.*

# SHTAR CAPSIZING—SAFETY SUGGESTIONS

BY

JOHN MORWOOD

Every capsizeable ship at one time or another has been turned over and this includes square rigged ships, Thames Barges, Dutch Botters, and, of course, dinghies and catamarans.

The multihull entrants in the Single-handed Trans-Atlantic Race, though possibly immune from some of the dangers of the single-hulled yachts, could, by some freak of the sea, find themselves upside down and far from shore and help.

It therefore seems reasonable that all such entries should give some thought to this problem and even have some method ready to deal with this eventuality, should it occur. The following suggestion, have been made to deal with the problem:—

1. A hatch should be fitted to all multihulls which can be opened from the underside. It should contain:—

   a. A tool to drill a hole in a hull or float to allow it to be sunk.

   b. Hammer (or axe) and nails.

   c. Strong cod line.

   d. A canvas bucket or buckets or pump.

2. The 50 fathoms of chain required by the rules should be capable of being brought to the underside of the deck of a capsized craft to be placed on the hull or float to be sunk and held there by cod line and nails.

3. A long pole could be fitted to the underside of the bridge deck of a catamaran or at the side of the main hull of a trimaran which can be swung out sideways. A large canvas bucket could be then tied to its end and it be raised by provided stays. On filling the bucket with water by another canvas bucket or pump, the hull or float could be sunk and, by shortening the stays of the pole, the craft brought upright.

Hello, John,

We look forward to the design of your self-righting multihull.

Yes, it is a rare designer who would admit that his competitor had a better boat—regardless of the circumstances. This is the attitude which will continue to drown innocent people—unless the designer himself exhaustively tests his boats in storms at sea—preferably during races when the boat is driven harder. Hedley Nicol was not afraid to try.

We cannot agree with the arbitrary setting of wind-force-capsize conditions. There are too many variables such as beam, weight, amount of float buoyancy, etc. We have driven hard to windward under full sail (main and jib) in Force 10-11. In such conditions we establish what we consider a maximum allowable heel and do not drive beyond this—feathering the required amounts when gusts appear. Such a procedure admittedly takes some skill, and is something we would only do in ordinary cruising when clawing off a lee shore, etc.

We are sorry to learn you are making safety recommendations to the committee handling the *SHTAR*. Here we have just about the only race which hasn't been overloaded with regulations—up to now. Stressing capsizes etc. does nothing but harm the public's attitudes towards multihulls—just as does the flaunting of visible masthead flotation. Why not have more stable boats in the first place? During the Crystal Trophy Race *STILETTO* was the only one (of 13) with sufficient stability to carry full sail on the reach to France.* (*Ed.* See below.)

It is our personal feeling that the *SHTAR* should be a two-handed race—for one man can't do full-time justice to his boat, and sooner or later someone is going to be run over by a steamer because he is asleep at the wrong time.

Yes, the floats on *STILETTO* have more wetted surface than rounded ones. What makes this boat so much faster than those with such rounded shapes?

ARTHUR PIVER.

Box 449, Mill Valley, California 94941.

*Editor's note:*—Arthur is not quite right here. Some others carried full sail. Jock Burrough writes that his *TAO*, a Musters Marine *TRIUNE*, the design of which is based on Arthur Piver's formula, also carried full sail, 585 sq. ft., on this Nab Tower to CH 1 leg. Not so much the wind Force 4-5 but the short sharp seas from several directions caused the worry. Other competitors in the Crystal Trophy do not agree with the claim in the Piver advertisement in this issue that STILETTO was "far faster" on the reach to France. Overall, she was 6th to finish on elapsed and corrected time.

## THE LOSS OF BANDERSNATCH

BY

LOCK CROWTHER

Box 35, P.O. Turramurra (Sydney), N.S.W. 2074, Australia

*BANDERSNATCH*, the Kraken 33 ocean racing trimaran which won the inaugural Sydney to Hobart Multihull Race of 1966-67, was

lost at sea with her crew of four early in September, 1967. The craft had been exhibited at the Melbourne Boat Show by the Trimaran Yacht Club of Victoria and was on her way back to Sydney under the command of Tony McLaren, a Sydney radio announcer. All the crew were experienced sailors.

When the yacht had been overdue for a few days, an extensive air and sea search was put into operation, but in the near-gale conditions that had arisen, it was not for some time that the craft was spotted, inverted, with one float missing. The carcass of a whale, with a large gash on its head was floating in the vicinity; a man employed by the local trawler fleet as a fish-spotter described this whale as the largest he had seen. A passing freighter attempted to haul the capsized trimaran aboard, but the lines snapped and a salvage attempt was abandoned in the heavy seas which prevailed. At the same time, the Trimaran Yacht Club of Victoria launched an extensive search of nearby islands, beaches and coves, to test the theory that the crew had unbolted a float and used this as a safety raft to reach shore.

When the salvage attempt by the freighter had failed, the designer, Lock Crowther and the owner, John Hitch hired an aircraft and attempted to find the wreckage, but this was not sighted. Some days later, the craft was re-sighted and towed to an offshore oil rig in the region. The designer and owner then organised for her to be towed ashore for inspection.

On investigation the following matters were noted:

1. The cross-beams were sheared off ("like carrots") at the place where the stilts were bolted and fastened through; there was no break in any glue join.
2. All lights—navigation lights, mast lights and compass lights—were off.
3. The radio was on "receive."
4. The only sail bent to the rigging was the storm jib of 40 square feet.

It is considered from these observations that the disaster occurred in daylight, that it happened suddenly and rapidly, and that the float had been lost by a violent impulse from forward. The possibility of a capsize by wind pressure is remote because of the small sail area carried.

A small section of the main hull had been battered in, and a stringer had been exposed; to this had been attached a number of ropes, which were presumably used as hand-holds.

The rough handling of the wreckage during the towing in rough seas damaged the structure and the hulk was written off as a total loss.

Dear John,

Re. *BANDERSNATCH*, owing to the original teething troubles everybody was so sure a stilt failure due to cracked weld etc. had occurred. It came as quite a shock to see the crossarm had failed in shear.

Some of the original thinking on the structural design and safety concepts may assist other designers and owners to learn from the tragedy and produce safer multihulls in the future.

In general the craft was stressed throughout using a safety factor of ten on ultimate fibre stress in bending and shear based on forces generated by the stability of the boat. With the submersible floats the stability does not increase with overloading, only inertia forces increase. Bending strength at the inner stilt connection point on the beams was based on the whole boat being dropped sideways on the point of the float keel and sustaining a force five times the all up weight. In actual practice the moment arm of the force would be somewhat less, the force acting through a point above the float keel.

*BANDERSNATCH* was designed as a flat-out racer where weight was cut as far as possible, the structure was very carefully laid out so that every part supported another, no redundancy, and stresses logically transmitted. No allowance was made for impact and it appears impossible to design any tri to take the forces generated in a collision.

Recent university tank tests carried out here suggest that a safety factor of five is required for a structure to withstand rough water. This would not appear to be sufficient for a small racer pushed hard through rough water, perhaps somebody will fit out a racing tri or cat with strain gauges throughout and obtain some invaluable information. This type of design information is essential for aircraft and multihulls are designed with the same object in mind—i.e. minimum weight.

The maincrossbeam which sheared first was designed as though it supplied all the strength and then the aft crossbeam designed to 80% of that strength. The fore and aft strength of the main crossbeam was approximately the same as the vertical strength. Shear strength of the main beam was a minimum of 40,000 lbs. at the bolt line—assuming poor quality wood in the wet condition i.e. being pessimistic. This figure gives a safety factor of ten, ignoring the effect of the $\frac{3}{8}$ ply fairing.

The aft beam failed in bending caused by the float twisting at the inner stilt bolt line after the front beam sheared.

The original Kraken 25 on which *BANDERSNATCH* was based was designed on the same structural concepts. When Kraken 25 collided with a 60 ft. cruiser the float snapped off just in front of the main beam. Fear of collision with flotsam led to filling *BANDERSNATCH'S* floats with foam as it was thought that the float would snap off; the craft retaining some stability could limp home.

The crossarms were ventilated, the maincrossarm having vents on the underside which scooped air into the cabin via holes in the ply webs. When the boat capsized the crossarms filled and she floated very low, about at her normal waterline. With the crossarms sealed she would have floated very high and the crew could have survived inside the hull. Foam flotation against collision was poured into the mainhull bow section to about one foot above the waterline and this again was useless in the capsized state.

Even though the undersides were painted in air-sea rescue orange she was not found for a week. Spotting planes had flown right over her, a Neptune bomber crew, who claim they can pick up a fish box on their electronic gear, flew right over her in calm conditions at about 100 ft. just before she was spotted by a freighter. From this it could be said that air searches are 99.9% useless and all boats would do well to carry a hand operated homing transmitter which operates on the frequency that trips world-wide automatic distress detection equipment. Such a transmitter would act as a homing device for aircraft to get a fix on. It could be programmed to send SOS followed by the yacht's name.

Although a tri does not sink, a crew cannot survive for long on an upturned boat in cold waters and gale conditions (67 m.p.h. recorded in Melbourne). A life raft with shelter cover and emergency rations is $400, fairly expensive but good insurance on one's life.

Also enclosed is a copy of comments on *SNATCH* by a 'Nicol' Islander owner who crewed on *SNATCH'S* trip to Melbourne for the Boat Show.

LOCK CROWTHER.
Box 35, P.O. Turramurra (Sydney), N.S.W. 2074, Australia.

## TRIBUTE TO BANDERSNATCH

The *SNATCH* was Lock Crowther's first attempt at an ocean racing tri, and it included many of the ideas he had learned from *JABBERWOCK*, his 25 ft. speed machine. After being launched

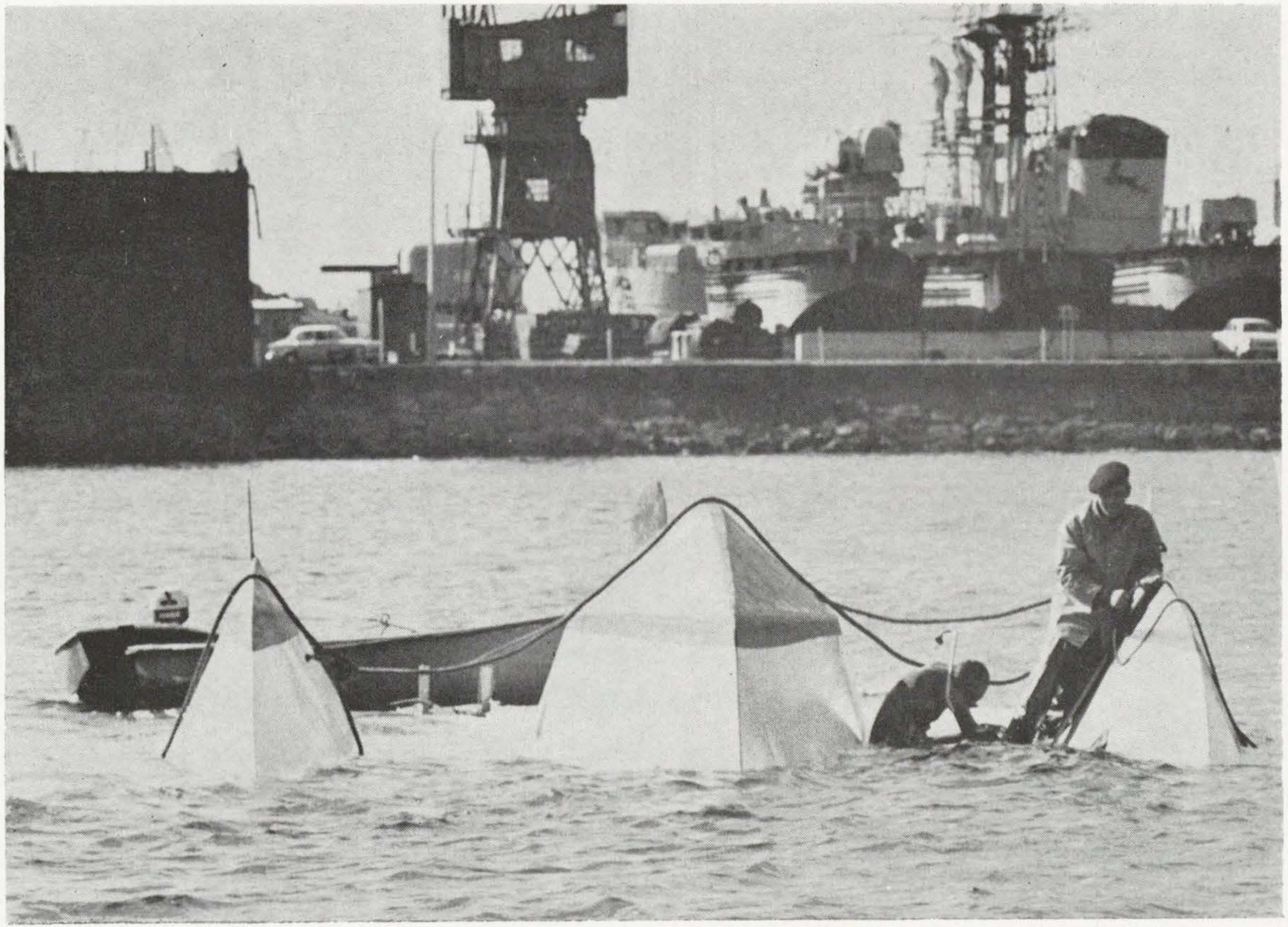
in July of last year it was soon found to be a flier. As it was designed mainly for the Sydney to Hobart race it was of little surprise when it won line honours and first place on corrected time, although it had stiff competition from *VIVA*.

After sailing to Melbourne in the *SNATCH*, I gained a love for her plus a confidence in tris I had never had before. She was extremely fast on all points of sailing and to my mind her seaworthiness was beyond question as we soon found out, after spending eight hours in a gale in Bass Strait. She gave you a feeling of power plus a confidence that she could take anything the elements would dish out. To my mind one of her most interesting features was the submersible floats. They gave you a margin of safety which to me is an absolute necessity in a racing tri. When the wind picks up and you are carrying too much sail, the lee float buries itself and the passing waves pound on the crossarms, as if Mother Nature was knocking to tell you it was time to reef down. On a tri with non-submersible floats, the difference between sailing her hard and being upside down can only be a matter of seconds. I would have thought that on a racing tri where you are pushing it to its limits all the time, a warning and safety margin to allow you to shorten sail would be most desirable. Arthur Piver is often publicly condemning submersible floats as unsafe—I wonder whether he has considered the above points. Although we all feel the tragic loss of four trimariners, at the same time I cannot help but feel a little sad for the loss of *BANDERSNATCH* for I know it will be a long time before we see another Kraken 33 on the harbour.

Dear Dr. Morwood,

Enclosed is a pretty picture of my 30 ft. Piver *NIMBLE* as seen by a candid camera in Simonstown after the freak storm which struck at 5 a.m. on 10th June, 1967. She flipped at moorings.

The wind blew down trees, de-roofed houses, completely removed the municipal market place, and created havoc in our boat park. The cyclone was travelling in a south-westerly direction. The University of Cape Town research vessel Thomas B. Davie was off Cape Agulhas at the time, about 100 miles south-west of Simonstown where my boat flipped. They recorded Force 12. Fortunately for shipping, it was of extremely short duration at this force, so the sea did not have time to build up. Four other Piver trimarans on swinging moorings escaped capsize. My mooring is 60 ft. of chain in 24 ft. of water. The "fetch" across the water for the offshore wind was 200 yards. A very slight ground swell was coming into the anchorage at the time. The boat is a *NIMBLE* with a plank mast. Total weight



*Dr. Heywood's capsized NIMBLE.*

at the time was probably $1\frac{3}{4}$ tons. As is well known, she is decked between wings as the design was built according to the plans but extra wing area had been added.

Oh to have witnessed the spectacle of the flip! The air must have been solid spindrift. Containers etc. thrown from lockers on keelboats indicate that they were knocked onto their beam ends, so a sudden side wind gust must have come as the edge of the eye of the storm eddied off the mountains. Violent lateral oscillations; a helping hand from the pressure on the mast; wing deck lifted sufficiently to catch the wind—and over! At any rate we know now that trimarans can flip at moorings. Sorry to have to tell you this, but we are all entitled to know. The plank mast was smashed on the sea bottom, not on impact with the water (mud, sand etc. on the mast head). This gives me the long awaited excuse to replace with aluminium. This episode refutes what I said in my letter to you written two weeks ago (I never posted it, though I did post the one to the Insurance Company cancelling my mooring risks policy, for which a year's premium would have cost me about the same as a new mast). I used to think that no wind could exert an appreciable aerodynamic lift under the relatively small area of the wing decks, when pitted against the weight of the boat. I was wrong. Most important factor was probably her being tethered to a mooring; couldn't sidestep.

For righting, first attempt was a downhaul on one float with block and tackle onto moorings, with uphaul on the other from a tunny boat. A Naval crane succeeded where this attempt failed.

How to prevent a recurrence? Wider beam. No decking over wings. No plank mast. Greater weight in main hull—people on board for instance. A couple of heavy tyres on a 10 ft. chain over the stern. Best of all, hurricane force winds please stay in the tropics where they belong.

My friends tell me to clip off my wings and fit underneath a heavy thing they call a keel!

Sir Francis Drake called ours "The Fairest Cape that e'er I saw in all the circumference of the earth." The Fairest Cape yes, but hardy Portuguese mariners before him had termed it, "Cabo Tormentosa," the Cape of Storms. They knew. Nevertheless, Henry the Navigator back in Lisbon insisted that it was "Cabo Boa Esperança," Cape of Good Hope. Good Hope! Two trimaran flips in a year in our waters. I will continue sailing my *NIMBLE* and my next boat if I could afford one would again be a multihull. In these

waters we don't seem to be able to stop fanning the flames of anti-trimania, but one large Cat and many trimarans are building in our area, including Six Nicol designs (decked wings!). A *NIMBLE* and a *VICTRESS* from Cape Town, and two *LOADESTARS* from Durban are cruising abroad at present.

Needless to say, some of the builders of new trimarans are worried by my flip. At least one is contemplating a radical alteration in the design of his boat, to eliminate the decked wings and substitute beams, possibly faired off to give streamlining. Our feeling is that designers have been too greedy, cashing in on the offered potential of deck space—at the expense of safety.

With kind regards,

BROOKES HEYWOOD.

59, Sandown Road, Rondebosch, Cape Province, South Africa.

Dear John,

I am looking forward to your design for non-capsizeability with hydrofoils. As I consider the most dangerous moment the one in which the boat is standing still with sheets cleated I at present fail to see how hydrofoils can do much good in such a situation.

I have no details concerning the South African capsize. Was it loaded with normal cruising gear? As we are having a hurricane in Texas at present and as loaded railway box cars are flying through the air I can understand how boats could be capsized. What would your hydrofoils do in such a situation?

There is no such thing as a completely safe boat. Any time you go to sea you are taking some sort of risk and I submit my designs have proven by repeated exposure they are safer than any other multi-hull or other type.

ARTHUR PIVER.

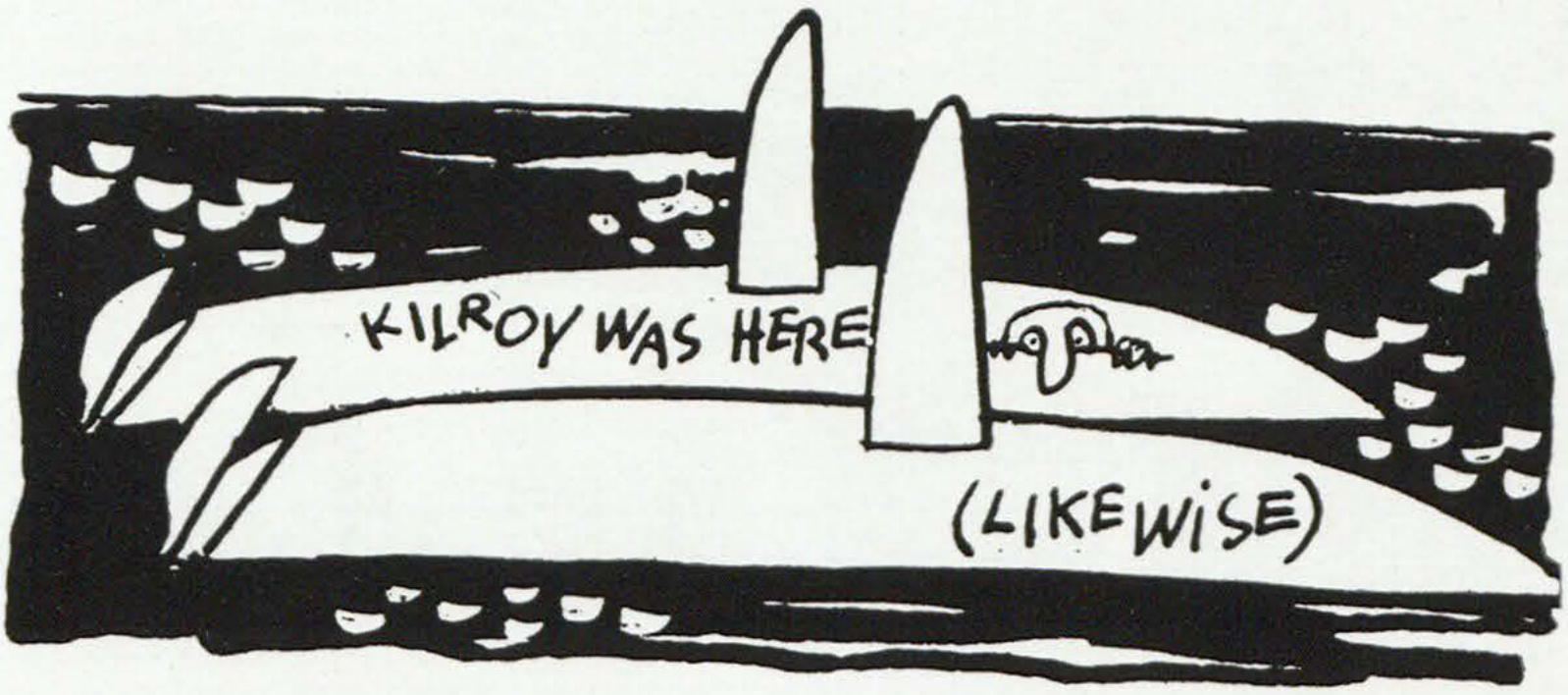
Box 449, Mill Valley, California 94941.

If Jim Kilroy, one of California's better travelled ocean racing yachtsmen, reacts strangely to the word "catamaran" there is a reason.

It seems that one fine day recently, Kilroy, his daughter, Dana, and four members of the crew of his 73-foot sloop *KIALOA II*, were sailing around Newport Harbour in the 43-foot cruising catamaran *ALLEZ CAT*.

The breeze was moderate and they were enjoying the sensation of zipping along on an even keel when a strong puff hit them. *ALLEZ*

*CAT* lifted her weather hull while Kilroy and his mates sought to free the mainsheet to let it run. Before they could succeed, *ALLEZ CAT* capsized.




They scrambled, still dry, up onto the weather hull, but in the perverse manner of her breed, the catamaran kept right on rolling until she had completed a hundred and eighty degrees and her mast was stuck in the harbour bottom.

While she lay there, some wag came along and inscribed one of the hulls with the war-time symbol and legend: "Kilroy was here."

*By Courtesy of* SKIPPER, MARCH, 1967.

Dear John,

I think we should examine the causes for the capsizings we know about. I have very little information on the subject apart from my racing season with Musters when he tried very hard to drive his *NIMBLE PLUS* to destruction—and failed. I should appreciate any information that you have.

There is a great danger in being tempted for the sake of racing or obtaining records to over step the mark and be imprudent. In a ballasted keel boat such imprudence does not often lead to disaster as not only are they self-righting, but they can also be considered to be self reefing, as heeling reduces the effective force of the wind on the sail area. Thus they can be knocked down with mast below the horizontal and still come back again.

In this respect the multihull has two disadvantages in that they are neither self righting nor self reefing. Provided this is appreciated and acted upon they can be as safe if not safer because of their shallow draft and thus unlikely to hit the bottom, and unsinkability.

Unfortunately there always will be idiots who go beyond the limits. The tendency is for the inexperienced to take to multihulls because in moderate conditions they are easier and more comfortable. Gaining confidence they become over confident.

Hedly Nicol was in a different category. He was like a test pilot who has to take his aircraft beyond the normal limits for scientific research. He perished as so many gallant test pilots have done but all in the cause of progress.

Hedly Nicol's *VAGABOND* designs had no built in cross arms and I think structural failure of the float connection could have been the cause of his loss. It was the main difference from Piver's designs. Musters thought that even Piver's cross arms were too weak and frequently told me that on his calculations there was only 10% margin, and he built his *TRIUNE* with much stronger cross arms. We have discussed the Multihull 'leap' and I have mentioned the subsequent roll which must occur under the influence of sail pressure without any corresponding stabilizing force. To land from sixteen feet or so dropping onto the whole length of a float with its flat sides must put a great strain on to everything. *TAO* after this performance showed no signs of strain anywhere. *TAO* is only 30 feet, and increase in size calls for cubing the stresses, and thus cubing the scantlings thus cubing the weight and thus putting even more stress on this manoeuvre.

In multihulls as in aircraft there are limits which must be designed into the vessel. Exceed the limits and it will break. Not so a monohull under normal usage. Put 5 tons of lead on a 10 ton displacement vessel and continued battering and movement may cause a failure. Sir Francis may get away with it but we all have our doubts.

Carry too much sail on a monohull and it may be uncomfortable and the speed does not change very much. Carry too much on a multihull and she may go slower and the chances of capsize are greatly increased.

In *TAO* I could only carry the big yankee up to force 4. Even then changing down to the working yankee made no difference to speed. There was less strain on the mast and she heeled less, offered smaller wetted area and went as fast. The amount of bend in the mast was a fair enough indication of going too far.

After talking to Don Robertson about *SNOW GOOSE* I am not surprised that Cats capsize. 36 ft. is still too small for a cat to have enough stability.

It is difficult to see how multihulls could be made self righting. I think they should be so arranged that a capsize when it occurs is not

disastrous, that the crew can keep alive and fit whilst capsized and when weather conditions allow they have the means to right the vessel and continue the voyage. Vito Dumas said that after sitting on the ceiling and finding that he survived and the vessel righted herself he had increased confidence.

The possibility of capsize under extreme conditions has to be accepted. Extreme conditions meaning not only stress of weather but also physical and mental exhaustion of the crew.

We should know in what position the multihull will float when capsized. Assuming all crew are below when the capsize occurs, will they get air to breathe? Is it possible to get out on to the upturned bottom? To do so do they have to dive under to get through the companionway into the cockpit? Would it be possible to fit a man-sized hatch on the side of the main hull, which would normally be above the water line, and when inverted would give access to the underside of the wing?

Assuming we survive our capsize and weather abates, now what? Means must be provided to flood one float. (My floats have 4,000 lbs. of permanent buoyancy). All moveable weights, chain, anchor, etc. to be moved into that float. Pump out the other float. Now the difficult part—attach the inflatable dinghy to the main halliard and wind it down to the mast head, and Hey Presto, up we come. Trials should be spectacular.

JOCK BURROUGH.

44, Bedford Gardens, London, W.8.

## HOW TO RIGHT A CAPSIZED CATAMARAN

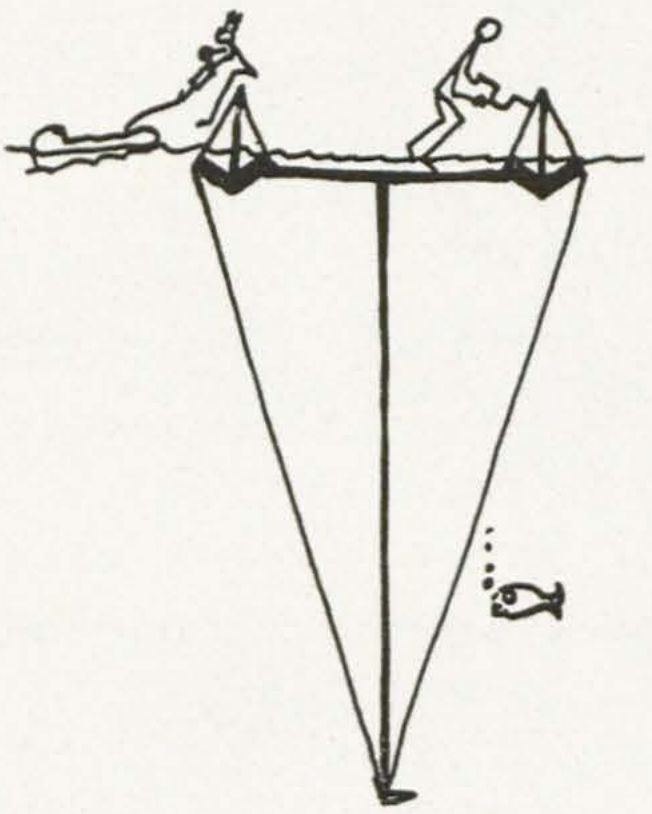
BY

E. BURNABY LAUTIER

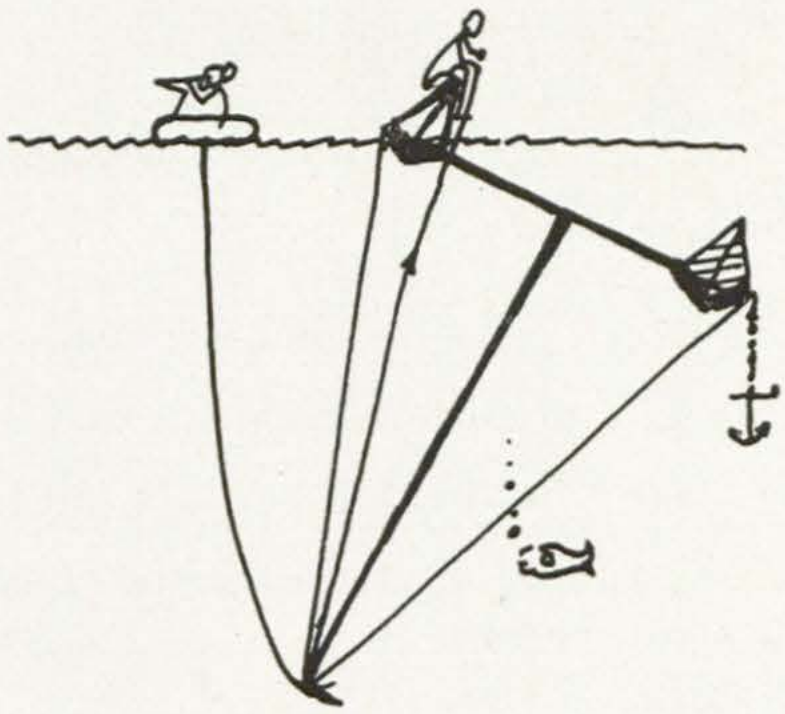
Stationsweg 56, Ede, Holland

Though capsizing does not occur very frequently on bigger ocean going catamarans, it certainly can happen, and has happened at several occasions. When a cat has capsized she is as stable as before, only in the upside down position, and this makes righting an extremely difficult job. So when you have the bad fortune to capsize at sea you may be in very serious danger if there is no help from others. And you need at least the gear of a steamer to right you again.

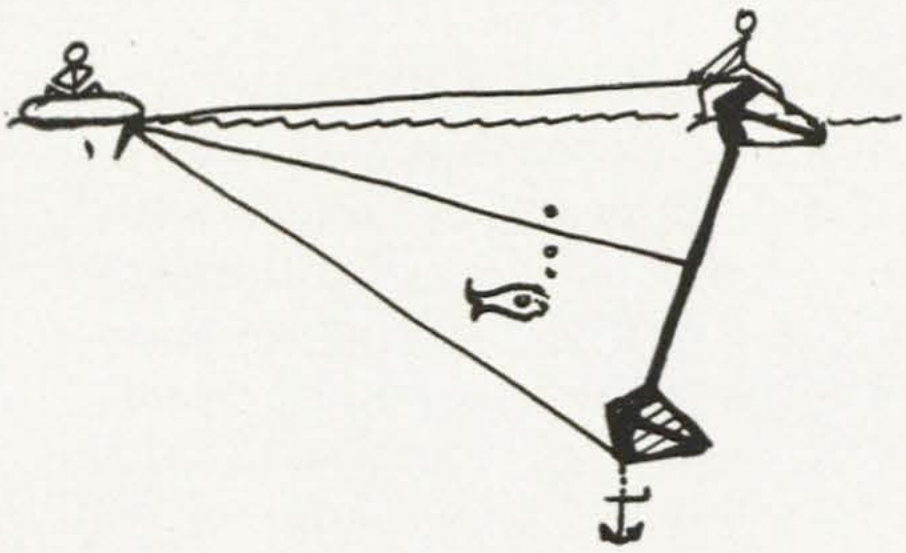
A remedy has been found in attaching a floating object permanently to the masthead. (A flying saucer). These prevent the vessel from a complete capsize, but for rerighting further equipment is necessary.



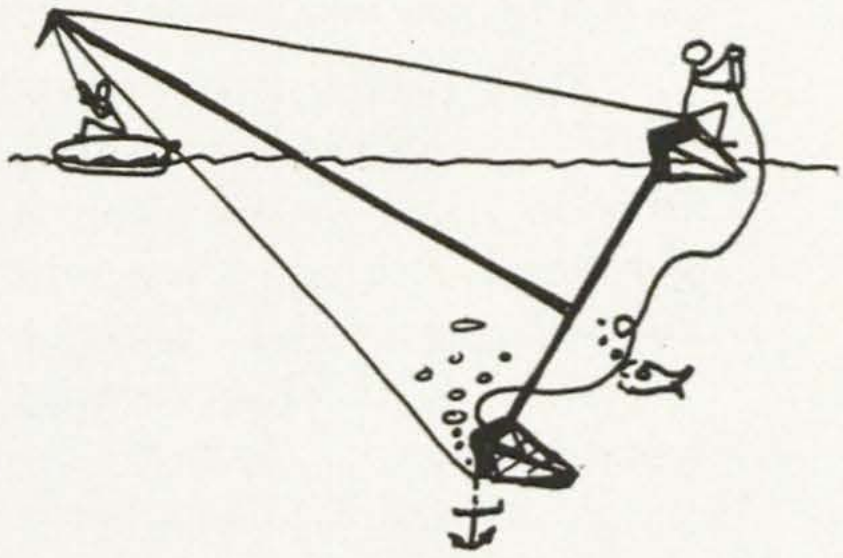
*Drilling Holes*



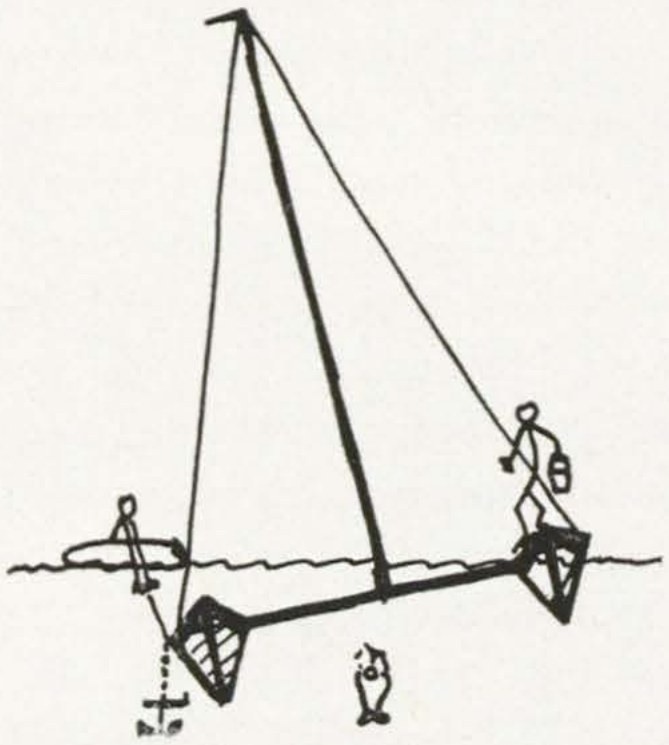
*Hauling the masthead to the dinghy*



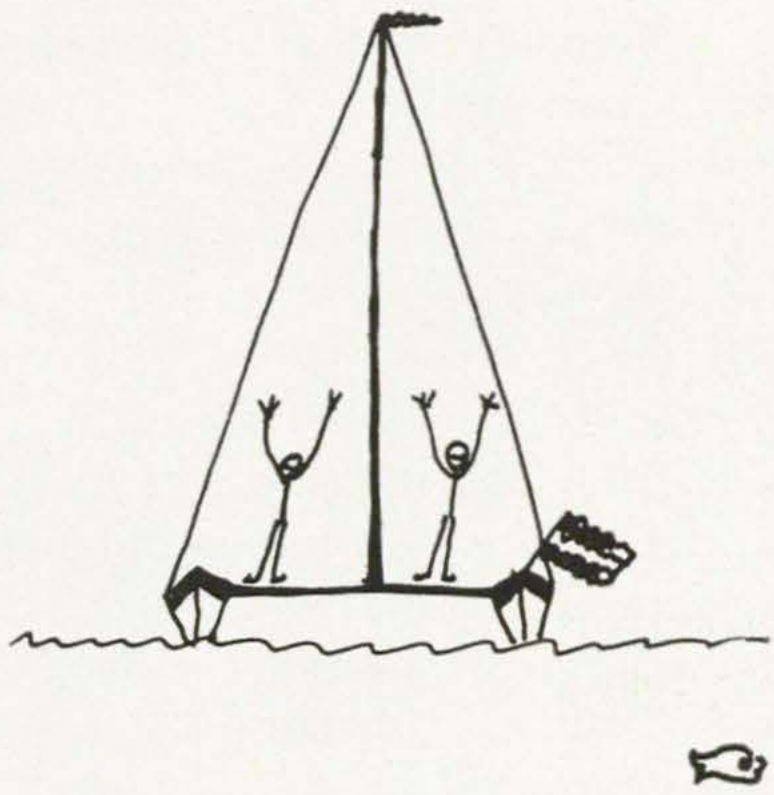
*Half turned position*



*Hauling down dinghy or pumping*



*Hull emerging again*



*Hear hear*

For instance a swinging mast, or some kind of ballast. The saucer also represents a considerable weight and windage aloft, and is very unpleasant to the eye. It is also a little strange to carry such a thing which certainly affects the sailing, for something that will probably never happen during the whole lifetime of the ship.

Therefore we have been searching for a better method, or at least one which gives no difficulties when sailing upright.

The simplest equipment that is necessary is:

An inflatable buoy or life raft (could be used as dinghy).

A handpump for air (either the converted bilge pump, or one for a bicycle or car).

A large drill and some corks. A tube as long as the mast approx.

All these things preferably attached under the platform, which is the upper side when upside down.

The procedure is as follows:—

Drill sufficient holes in the bottom and side of the Starboard hull. Not in the inner side preferably because that side is necessary to form an air pocket afterwards. If it is not possible to fill the hull completely without them, they must be shut off sufficiently before the hull submerges. For a wooden hull it will be necessary to load her with all the heavy equipment on board, such as anchor, spare wire, chain, etc. It is good to calculate before how much additional weight is needed to sink her.

The tube must be passed through one of the holes to enable us to pump air into the hull. Don't forget this, because afterwards it will be several metres under the surface.

Secondly the buoy is attached to one of the halyards, and brought to the port side of the ship. There are two possibilities now. I think the easiest is to fill the buoy at the surface, and to haul the mast top towards it. As one of the hulls is full of water, there is no stability, so this may be an easy job. When this nevertheless is too heavy, the buoy can be hauled towards the masthead, and be inflated by means of the long tube.

After this the ship will float with her port hull and the masttop at the surface. In this position the starboard hull has already passed underneath of the port one. To manoeuvre her in an even a little more fortunate position the buoy can be hauled down a little along the starboard stay. If the buoy is big enough this can be done until she is at the starboard bulwark, and the ship will be upright again. If she is not, she will sink half way under the weight of the rigging.

In every case the buoy must be big enough to enable the starboard hull to pass under the centre of gravity of the whole ship. Then air will be pumped into the submerged hull, whereafter the ship will right herself.

Finally the holes have to be shut, the hulls drained, and the damage calculated.

*Remarks*

The system can be applied without much trouble to nearly every existing cat. However when considerations can be made before she is built, the drill and corks could be replaced by valves, but I doubt if this will be worth the costs because the whole system will probably never be used.

It is certainly possible to use an ordinary dinghy except for the filling underwater, but she will be less safe.

It is good to calculate beforehand how much buoyancy is needed to right her without pumping air into the submerged hull, because this makes things a lot easier.

If the ship has a wooden or even better a foam filled mast, it might occur that the mast floats to the surface all by itself.

If the centre of buoyancy of the air pocket to be pumped in the submerged hull passed already under the centre of gravity in that position, the whole dinghy procedure can be left out.

If such is possible depends highly on the ships geometry, so this must be calculated out precisely beforehand.

In a wooden ship the main difficulty may be the sinking of a hull. It will be wise to carry all the equipment with a high specific gravity in one hull.

Dear John,

One should state any cause concerning multihulls conservatively, accurately and with all possible qualifications so as not to unintentionally mislead people. It is an easy thing to mislead people with an authoritative publication.

I am one who is confident but who has the greatest respect for the sea and for nature in general. What works for day racers often is completely impractical at sea. Even if technically feasible, the cost can become so excessive that it precludes utilization. As in Space exploration, the limitation's to man's accomplishments are environment and economics. Technological progress is necessarily

balanced against cost/effectiveness, especially in a sport where there is no military or scientific necessity for advancement.

As to the "multihull leap," any man that sails a cruising multihull, weighing at least several tons, so hard that she can leap clear of the water is displaying poor seamanship and deserves to suffer a damaged boat. A day racer can do so with impunity because of her very light displacement and because mere surface-chop conditions can cause one to leap clear at high speed. A cruising multihull can never leap clear at any speed in surface-chop conditions partly because of her displacement and partly because her size is not affected by little seas. To leap clear with a cruising boat, one has to have a large and formidable sea running, a strong wind, and a foolhardy crew driving a boat to windward or on a close reach without regard to consequences. Even then, one has to be lucky (?) to leap clear.

Regards,

Newport Beach, California. RUDY CHOY.

## MULTIHULL LEAP

BY

ARTHUR PIVER

Mill Valley, California

We have had the opportunity of studying leaping multihulls in a fine film on fast sailing which has been shown at American boat shows. This depicts catamarans surfing on California beaches. These craft are seen sometimes leaping completely out of water when sailing against steep beach waves. It is noted that as soon as the boat is airborne it starts to capsize—landing heavily on the lee hull in even relatively sedate leaps.

We first encountered this phenomenon at Sea during a trans-Atlantic attempt in our 38 ft. *BIRD* in March of 1964. We had been bound for England and the start of the Single-Handed Race at Plymouth. We had endured an agonizing night of hurricane-strength winds with far greater turbulence than we had yet encountered.

Three headsails had been shredded, and as we then were well ahead of schedule, decided to head upwind for Bermuda some 400 miles where we could obtain new sails. We did not want to waste any time, and with full main and our remaining jib drove the boat close-hauled against the 40-knot winds then blowing. Following is the account from our TRIMARAN THIRD BOOK.

What a discouraging difference a head wind makes! It appears many times as strong as the same amount going in the opposite direction—the first wave we encountered seemed to be made of solid rock!

Never have we driven any of our trimarans so mercilessly—full-out against still-breaking seas which tossed us about like a chip!

Every once in a while we would apparently fly right out into space while surmounting a wave top—and *BIRD* would land with a shuddering *crash* which must surely rend her asunder!

We could feel the preliminary motion just before she would take off on one of these monstrous plunges, and would quail in dreaded anticipation as she prepared to leap.

When we landed it was even worse, and the Skipper kept searching for broken planking which must surely result! He found none.

Often she would make all the preparatory motions but when we fearfully expected to land with the fearsome *thud*—would find a friendly slope to ease her down to her accustomed more decorous attitude.

We made good time for two days, becoming almost accustomed to the outlandish gymnastics our poor craft was forced to perform.

The above stress came to naught, for we were later becalmed; running out of time to reach England for the start of the Race.

Our being able to drive so hard to windward as above illustrates one of the truly remarkable features of the trimaran. With great stability which keeps the rig upright where it can hold the wind, and slender hulls which knife through wave-tops, they go to windward as never before achieved—a considerable safety factor when beating off a lee shore. A breaking wave can stop the light boat in its tracks—but it will immediately resume going to windward. This in a situation where a ballasted boat with sufficient sail to go to weather would be knocked flat—and if stopped might refuse to even begin sailing until the wind lessened.

During the voyage above we encountered fierce head winds while approaching Bermuda, and learned anew that the harder it blows the faster *BIRD* would go up-wind. In our race to beat approaching dusk on a rocky coast, we would glory in every vicious gust—wishing for even stronger and more numerous ones! We found ourselves in shouting supplication: More wind—Blow!—Blow!

A similar situation was encountered in the same place at the close of the 1966 Bermuda Race (aboard the 33 ft. *STILETTO*). We arrived at the Island at night with a 60-mile-an-hour head wind.

Anxious to finish a race which had been spoiled (for the second time) by losing our genoa—we carried full mainsail and a working jib—driving the craft as hard as possible. In such conditions we sail by degree of heel. During stronger gusts we feather by heading up slightly, spilling some wind from the sails. It is essential that headway must be maintained while feathering, and we find sensitive helmsmen are needed at such times. Such helmsmen are best developed by sailing planing dinghies—in which the crew must become part of the boat.

As far as degree of heel is concerned, we have a general rule that pressure should be relieved when the edge of the lee float is flush with the water. This can vary in intensity of driving—as various of our boats have different proportions of float buoyancy in relation to overall buoyancy. In our earlier designs we believed it a safety measure to have the boat heel easily, thus spilling the wind. This worked satisfactorily, but as we drove the boats harder and harder with no ill effects, gradually increased float buoyancy. *STILETTO* 1 has the proportionately largest floats of any of our craft—the idea being that she could be driven that much harder. This one has such great stability we usually do not drive the float as deep as earlier trimarans—although in squall conditions with inattentive helmsmen the entire float has been driven under. Later models of *STILETTO* have slightly smaller floats, as we felt the first one had so much stability there was a possibility of damage to the rig in extreme conditions. With the original large float, which has sufficient buoyancy to float twice the entire boat weight, we thought the central hull would rotate about the float—with attendent danger of capsize. However, the central hull refuses to rise—regardless of amount of pressure.

*Safety in Design*

We would like to explain the reason we have long considered that the safety of the Nicol designs should be questioned. Assuredly the ocean can become so rough that a boat may be lost through no intrinsic fault of design—but one feature of these boats we have doubted is the lack of forward buoyancy in the floats. Such a shape (which is indeed faster when driving through waves) may operate satisfactorily in most conditions, but in a storm at sea things can drastically change. During a multihull leap as described elsewhere it is obvious that adequate buoyancy is essential. It has been suggested that such a leap might have accounted for the disappearance of Nicol. From our experience we would say that only a dedicated racer would drive his

boat to such a degree—and only a lightly-loaded trimaran would actually leave the water. The crash when landing is so overwhelmingly brutal that one experience should be enough—and the boat in question was only cruising.

Adequate forward float (and central hull) buoyancy is essential when surfing swiftly down a wave in order to keep the bows from burying (another reason for overall light weight). The needle-like hulls of some of the latest designs would be interesting to study during such stressful conditions.

If a trimaran with a considerable amount of sail set and sheets fixed is caught in a squall from a new direction—especially when not moving through the water—far more than ordinary float bouyancy is required to keep her upright. Float shapes may be fine at the water line, but we keep ours relatively full at deck level.

For sudden gusts we have devised our automatic sheet release. Although we hold a patent on this device, any individual may easily construct his own. We consider this a must on sea-going multihulls.

*Multihull Capsizes*

We consider it valuable to analyse multihull capsizes in the hopes they will become even rarer than they are now. It would be admirable to develop a model which is positively self-righting.

It seems obvious with extensive experience in Piver trimarans that when properly handled they are already safer than is the usual ballasted boat. If people are warned against these trimarans because of the apparently remote possibility of a capsize they would have no choice but to shun the Sea.

*Race Qualifications*

It is nice to know organized races are being held for multihulls; although regulations for these are based upon conditions referring to distinctly different types of sailing craft.

We question the specifications for ground tackle in the Round Britain and Crystal Trophy races. We designed *STILETTO* (and her British sister *STARTLED FAUN*) with the expectation of using a main anchor (and gear) weighing about 50 pounds. This allowed for a 20-lb. anchor, 8 ft. of $\frac{3}{8}$ in. chain, and the remainder $\frac{3}{8}$ in. diam. Nylon line.

Race regulations then confronted us with a requirement for main anchor and chain totalling 300 pounds for this size boat for the Round Britain Race—and almost as much for the Crystal Trophy Race. This is *six* times what the boat was expected to carry—a staggering amount when you consider the agony with which even one excessive pound is regarded in these light craft whose performance (and also safety) deteriorates markedly with extra weight.

What is the practical result when a two-man crew is faced with retrieving such a weight? If the anchor has dug into the bottom the slightest—it would be nearly impossible to even break it out—for to carry an anchor winch in addition to an already overwhelming weight would be just too much. Thus the crew is faced with the prospect of being able to anchor only once during a race—perhaps giving rise to hazards far more deadly than if they had what we consider a normal weight of ground tackle. The regulations might require such tackle for the start of the race—is it also required for the finish? Perhaps there should be a handicap formula which applies to the point in the race where the anchor was lost.

Regulations also require the spinnaker pole (or poles) to be attached to the mast. This nullifies one of the advantages of the considerable beam of the multihull—for with the possibility of using the pole at different points about the deck much greater effective sail area may often be carried.

In *STILETTO* and her earlier sister, *BIRD*, we carried aluminium poles in the after cross-arm. These could be extended (up to 10 ft.) giving a sheeting base 40 ft. wide.

## HANDLING THE TRIMARAN IN STORM CONDITIONS

BY

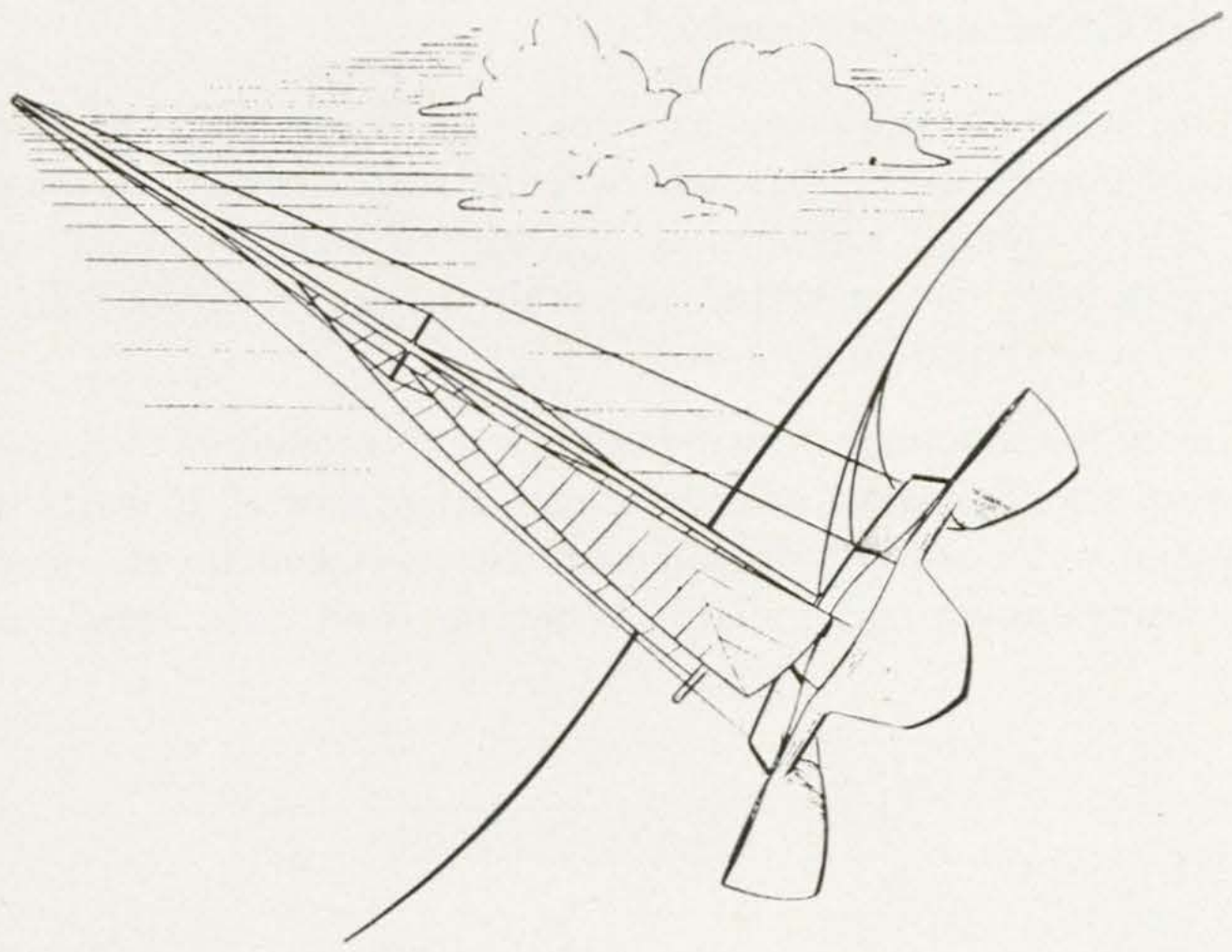
ARTHUR PIVER

Extract from "*Trimaran Third Book*"

Centuries of sailing experience has proven the most dangerous thing to do in a storm is to run too fast down-wind because of the possibility of either broaching (an uncontrollable swing into the wind), or driving the boat clear under water at the bottom of the wave.

In old sailing ships either procedure could be quickly fatal: modern ballasted craft which are reported missing have possibly suffered a similar fate.

On our first Atlantic trip we were running before large, angry-looking waves (estimated Wind Force 9-10) which would arrive with a swish and a roar—breaking right at the Transom. The broken water



would then hurtle by the boat—while the crew shuddered at the thought of possibly being struck on the beam—rather than from astern, where the transom presented a comparatively small target.

We were dragging a mooring line in the traditional manner—both ends were aboard. This was to slow the boat and help keep her straight before the waves. Suddenly the line twisted upon itself—reducing the drag—and when the sea steepened prior to breaking the Trimaran surfed swiftly ahead—with the threatening white water boiling well astern in apparent thwarted outrage!

That was all we needed to know, and with the line pulled aboard we surfed for hour after hour—with no water on deck except for occasional spray from nearby breaking waves.

Even more exciting was the discovery that if the seas were sufficiently large we could surf across them like a surf-board, having greater choice of direction and even additional speed.

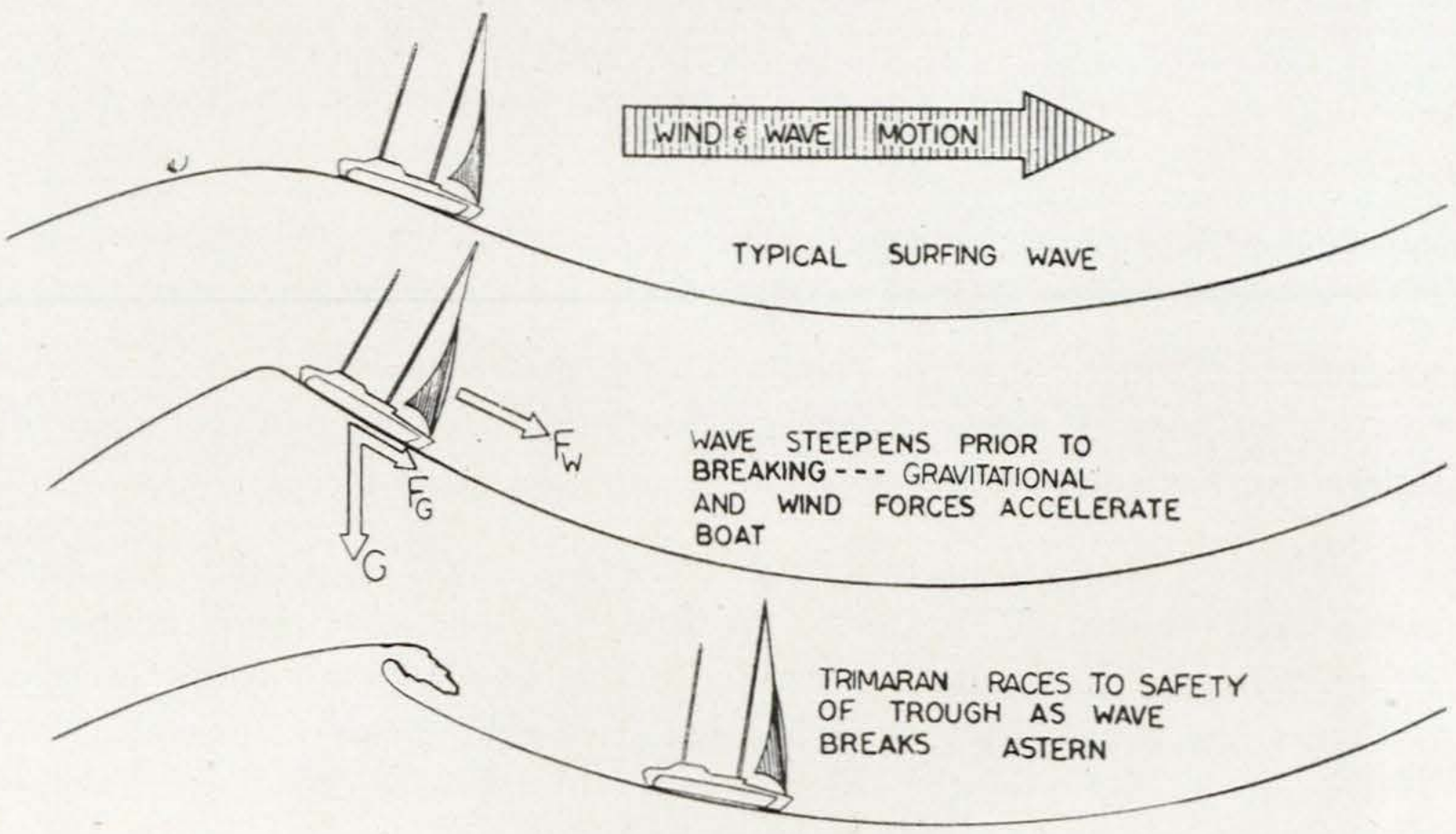
Reasons we can surf and thereby stay ahead of dangerous crests are twofold: (1) Deep-sea waves are unlike beach waves (which can

be entirely concave) in that usually only the upper portion actually breaks; and (2) although this can be of formidable dimensions, there still remains a slope ahead.

The light Trimaran can accelerate rapidly, and as it has no limiting hull speed (speed limited by length) as does the ballasted boat, can apparently accelerate indefinitely.

Thus, when the sea steepens prior to breaking, the craft, with the addition of gravity to the drive of the sails—dashes swiftly (and safely) ahead. Only enough sail area is exposed to start the boat surfing, for there is little use in trying to climb the wave ahead. In fierce winds this may require only a tiny jib.

The accompanying drawing shows the sequence: when going down-wind the Trimaran will zip ahead, then slow as it starts up the back of the wave ahead. It will next be overtaken by the same sea astern—rising higher and higher. When the wave crest again steepens




Surfing sequence

prior to breaking—Zip! The cycle repeats, with the boat progressing in a series of pulses, to endure as long as does the particular sea upon which it has been riding. Usual seas persist for only minutes—with experts differing as to endurance times.

The wave will subside in a flurry of foam, and the multihull will sail comparatively slowly while awaiting the next one to come from astern.

One great advantage of the type in such conditions is that it does not roll, giving infinitely more comfort in what can be the ideal Trade-wind sailing—whereas ballasted craft may roll to such an agonizing extent the crew sometimes cannot endure it.

If there is not sea-room in a storm to run directly down-wind (the most comfortable procedure), there are a number of alternatives: We can drift; heave-to; lie to a sea-anchor; or battle to windward.

It took years of trimaraning before we could fully accept just drifting in breaking seas—which in our boats results in being broadside to the waves.

Although it is unsettling to have a sea break against the weather float with huge *boom*! like a gigantic drum, nothing seems to be damaged—although the feather-light Trimaran is jerked sideways through the water. By yielding to the blow, destructive impulse forces are vastly reduced—whereas a comparatively immobile ballasted boat fights the Ocean with its own weight.

As neither keels nor centreboards are required on our cruising models, resistance to sideways motion in such conditions is thus decreased.

We use fixed fins on our floats. These do not extend as far down as the bottom of the central hull, and thus do not interfere with the considerable advantage of a beachable boat. The fins are not necessary to prevent leeway when sailing—but tell the boat where to pivot while manoeuvring.

The sharp-bottomed floats restrict leeway; and the harder the wind the more heel and the greater the effective lateral plane.

Heaving-to is most simply done in the two-mast versions by furling the jib and mainsail and tightly sheeting the full mizzen.

The helm is lashed to leeward just past centre. This is important because we have discovered these boats can make sudden bursts of speed astern when nearly head-to-wind, and a hard-over rudder could impose destructive strains on the fittings thereof.

The amount of travel astern in these vessels when hove-to can be surprising. After being hove-to for forty-eight hours in the 35-foot *LODESTAR* near the Kermadecs in the South Pacific we found we had backed up 95 miles!

In heaving-to in the sloop versions, only a small area of reefed main (or stormsail) is required.

A boat in a gale can drag a surprisingly large sea-anchor with no apparent effect—but with a parachute things change drastically. We have used a 24-foot-diameter Nylon cargo chute, and it is the nearest to being anchored to the bottom itself.

The parachute is attached with 100-odd feet of springy Nylon line ($\frac{3}{8}$-inch through 35-footers), which acts as a gigantic elastic, absorbing the shocks of breaking waves. The narrow hulls, of course, present little frontal area to advancing seas. Adequate wing clearance is essential in such conditions.

The parachute looks like a huge jellyfish under water, and its effectiveness was dramatically proven when *LODESTAR* lay comfortably (by the bow) to one near Rarotonga—in a storm so severe three nearby Japanese fishing boats foundered—with a loss of 50 lives.

Our Trimarans, with slicing hulls which cut through wavetops and great stability which keeps the sails upright where they can hold the wind—go to weather as no other type has ever achieved.

A surprising (and gratifying) characteristic of *LODESTAR* was realized when at the Roaring Forties near New Zealand. We had to beat at the time, and learned that under working jib alone she would steer herself to windward—slogging some 100 miles in 24 hours against fierce headwinds, while the crew relaxed below in the dry—brewing goodies and congratulating themselves upon choosing so considerate a conveyance.

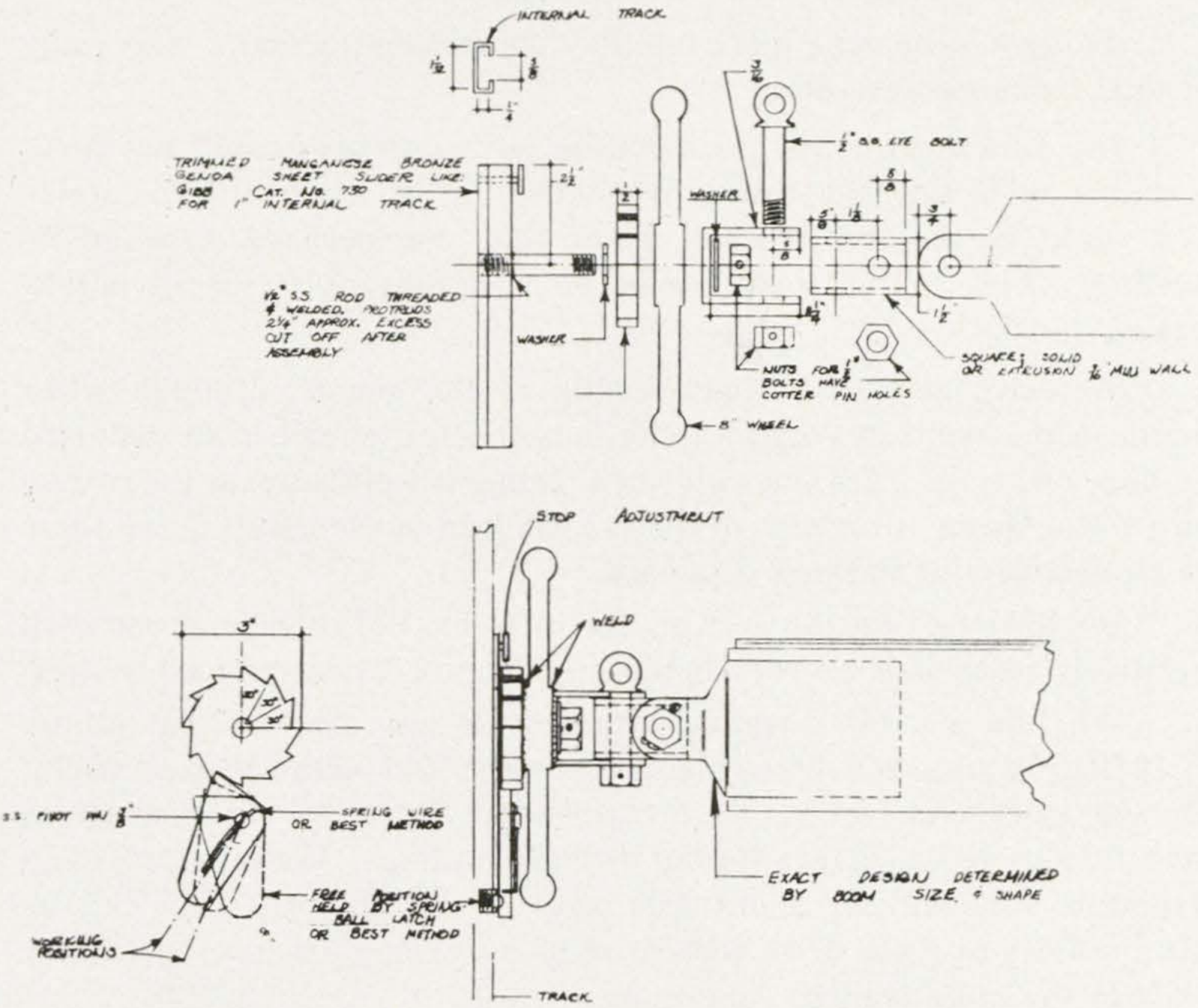
We have encountered freak waves in several storms. On each occasion we would be surfing swiftly down very steep seas—when suddenly an apparently vertical wall of water would well up ahead!

The Trimaran would crash into this—like an abrupt encounter with a soft-yet-solid wall! The boat would momentarily stop but immediately would rise to the surface and continue sailing—in a rapid-fire sequence.

We always fit our craft with roller-reefing gear—although in the 2-mast versions in rugged conditions we have found it far simpler to furl the mainsail. Under jib and mizzen the boat is perfectly balanced, goes well to windward, and regardless of how hard it blows doesn't appreciably heel.

Reefing is sometimes necessary, however, and we have developed our own procedure for such occasions.

We never seem to reef in time, usually feeling that it could not possibly blow harder—but could only lighten, instead. Result of this often-misplaced optimism is our fighting forward to the mast in conditions of strident adversity—even though a remote-reefing arrangement could be achieved by leading the halliard to the cockpit, and having a wire-actuated reefing drum at the goose-neck.




Roller-reefing Gear

At these times we hate the usual worm-driven gear, which is maddeningly slow—with innumerable turns resulting in only a few feet of sail being reduced. There is also the chance of losing the handle overboard while hanging on by one's eye-brows!

Because of the power of the worm-driven gear with possible damage aloft, we do our reefing with the sails flogging—another reason for a fast-acting mechanism (see accompanying sketch).

We have found when roller-reefing, the boom must be tilted (with the topping lift) at a definite angle (about 20 degrees) before rolling. If this is not done, when the sheet is later pulled in to go to

windward, the aft end of the boom may sag down to the deck, and efficient windward progress becomes impossible.

We have contemplated the fitting of a dual-purpose storm sail—a fairly common feature.

This could be mounted so it remains fixed to sail slides at the foot of the mast. A switching arrangement on the track could enable it to be quickly hoisted when the mainsail is furled.

This could be done more rapidly than reefing the main—especially if dual halliards were fitted.

In addition to being quick-setting (although area could not be as variable as reefing the main), when beating to windward the storm sail could be of more efficient shape than one perhaps distorted by reefing. This better shape could be a significant factor in ocean-racing.

We have also used roller-reefing of the genoa, although when hard on the wind in rugged conditions the reefed sail is so distorted it loses efficiency. Off the wind such reefing is a pleasure, as the reefing line to the drum at the tack of the sail can lead to the cockpit, and there is no necessity of slacking a halliard.

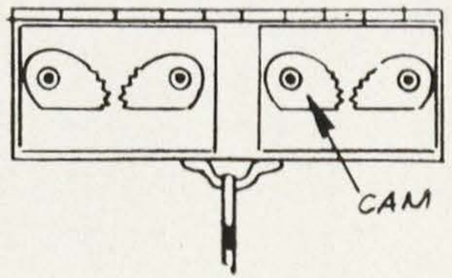
We have had reefing gear on our mizzens, but in general use such relatively small sails aft they become ineffective when reduced in area.

We had a remote-reefing arrangement on the working jib on *NIMBLE* during our first Atlantic crossing, and found it most useful during gales. However, all the attendant lines on that particular installation are a nuisance during ordinary sailing. We now provide a grommet fore and aft about half way up the jib joist—and can tie reefing lines to these if we wish to reduce working jib area—necessary only in the most strident conditions.

We prepare for sea by previously subjecting our Trimarans to vigorous testing. This is easy in the turbulent winds of our home-port—San Francisco. We drive the boats as hard as possible—preferring to be near a ship chandlery in case something should carry away. Thus we go to sea in an already-proven vessel, and plan to handle her more cautiously off-shore.

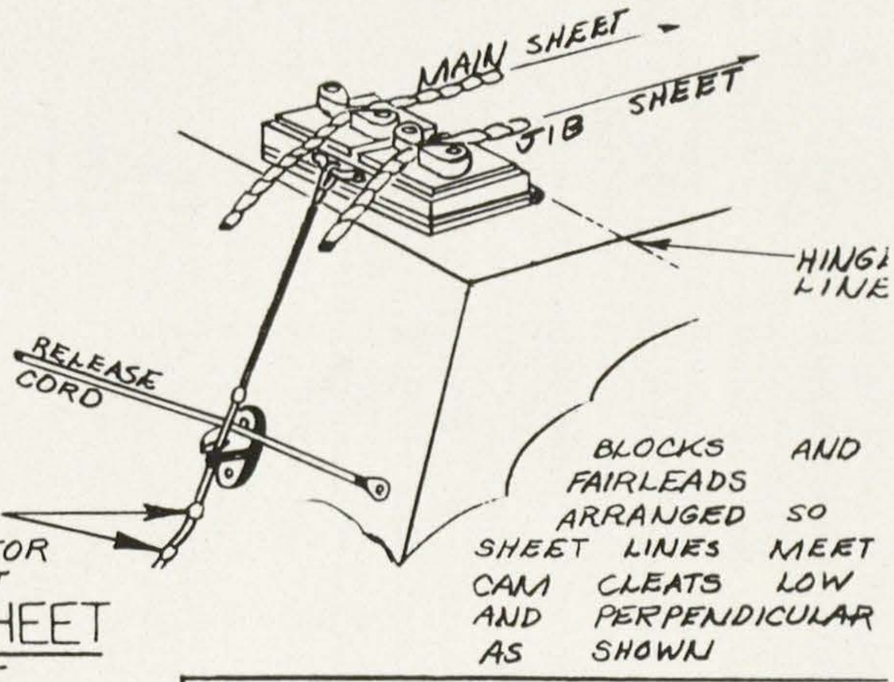
There remain certain hazards:

One is that approaching squalls may occur at night or when the helmsman is otherwise inattentive; and the stability of the Trimaran is so considerable some means has to be found to protect the sails and rigging. This has resulted in the invention of the automatic sheet-release (see illustration). This is usually set to let go the sheets in winds of approximately 40 knots.









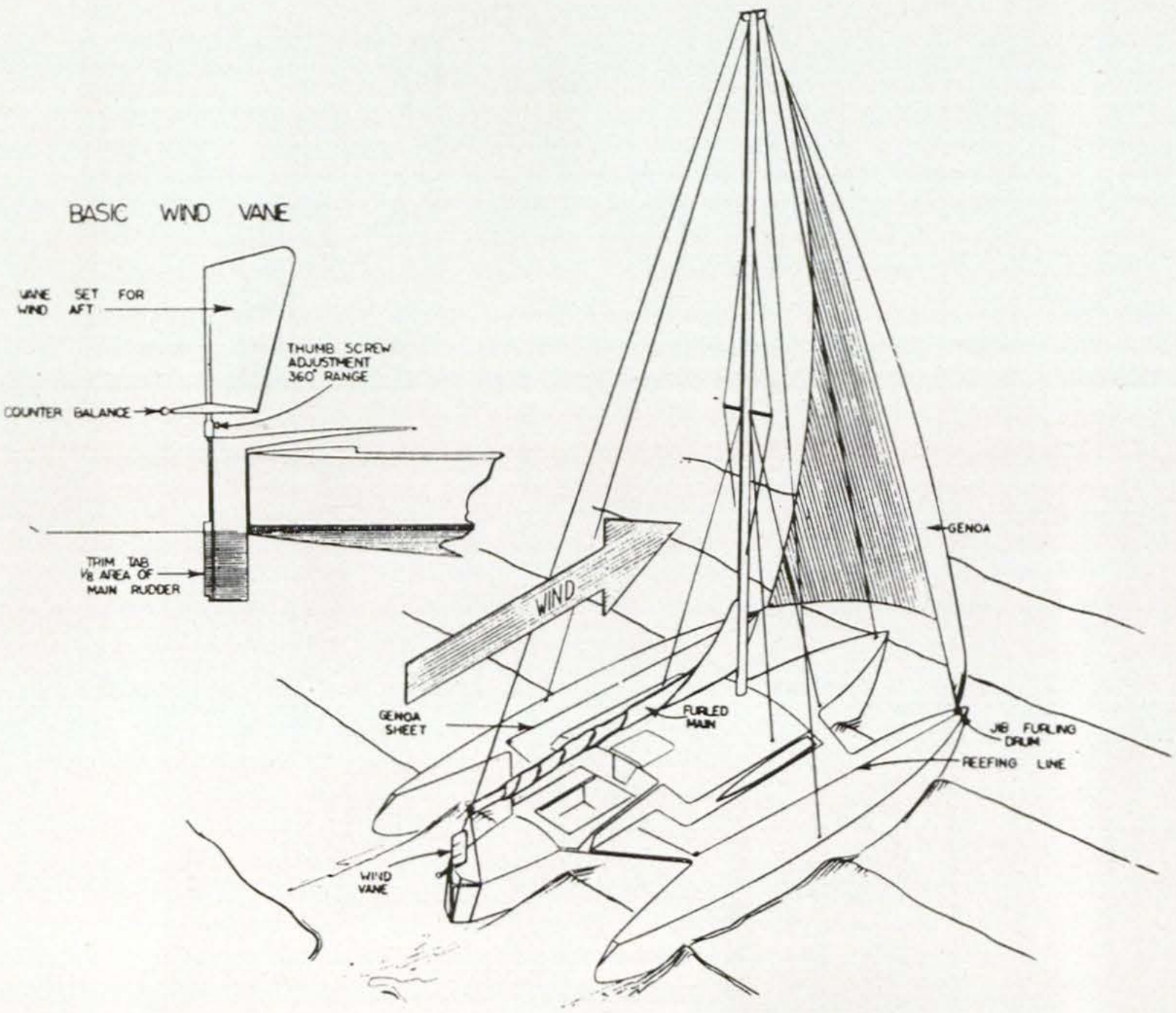

12/2 AUTOMATIC SHEET RELEASE

U.S. LETTERS. PAT. NO. 3,046,929

As mentioned earlier, when running down-wind in a blow we use only enough sail to start the boat surfing when the wave crest steepens. This generally requires only working-jib—or less. Our boats are so easily driven in even light airs when cruising down-wind we usually use no boomed sails. Our favourite arrangement is to stretch the genoa across the ship forward of the mast. This acts like a triangular square-sail, and as no boomed sails are used, there can be no jibing and the pull from forward makes steering easier.

As wind increases from astern, the genoa is replaced by the working jib. Although this sail is often fitted with a club (boom) for self-tending while tacking, in such cases we lash it to one side so it cannot jibe.

A simple method of varying down-wind sail area was one we worked out for *BIRD*, but actually did not instal (see illustration).



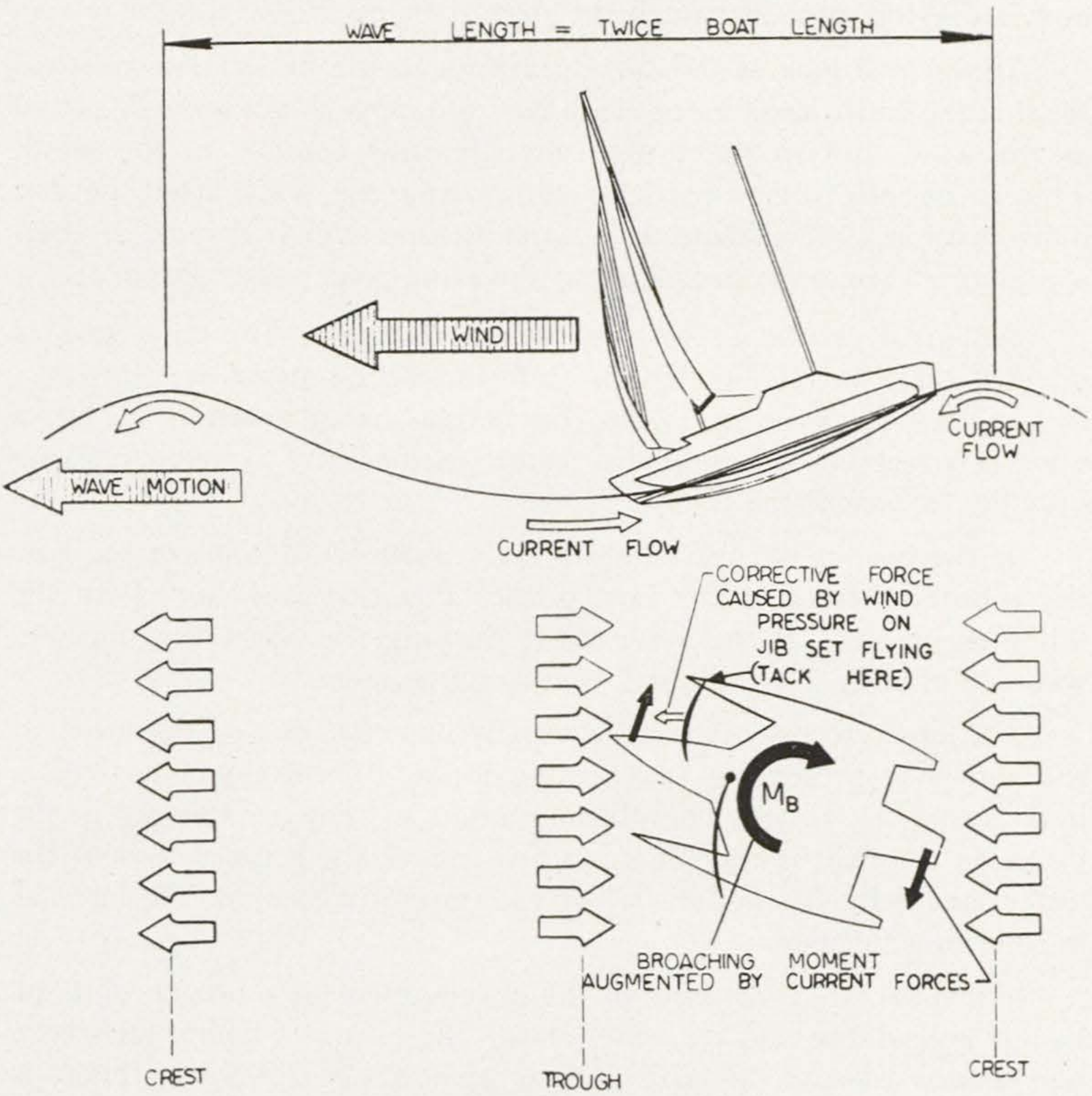

Down-wind cruising rig

A further advantage of the considerable beam of the Trimaran is realized when the wind is from the quarter—the most difficult angle for steering (when the mainsail is set). We have found that by

fastening the tack of the jib to the bow of the weather float—balance is restored. The wide beam is also handy when the mainsail is set with the boom well out.

By pulling the end of the boom well down to the deck, chafe is minimized because the sail cannot belly forward and rub against the stays. Degree of chafe is, strangely enough, related to the weight of the boat. We have never had to fit chafing gear on our Trimarans. Also, as the full effective sail area is thus presented to the wind, maximum efficiency is achieved.

Just about the most terrifying experience during a period of large waves is broaching. Because this phenomenon is little understood and because the sailor invariably blames the boat instead of his own lack of knowledge, we would like to dwell upon this subject:




Forces causing a Broach

Broaching is an uncontrollable swing into the wind, and in a Trimaran can be particularly frightening, because speeds well in excess of 20 knots are possible, and if an already apprehensive sailor suddenly finds himself flying along entirely out of control, terror added to dread can add up to a fervent wish he had stayed home!

As far as steering is concerned, our designs with three parallel hulls just want to go straight, and non-heeling tendencies which do not change underwater shapes—have far more directional stability than the monohull.

Why then do these easily-controllable multihulls broach? The accompanying diagram gives some idea. It is drawn showing the conditions in which broaching would be most likely. This occurs when the wave-length is twice the length of the boat—so when the bow is digging into the trough the stern is being lifted.

If you will look at the current arrows in the illustration you will see that the entire surface of the sea does not move in the same direction as the wind, but in the trough actually runs counter to the wind. This is because water particles comprising the wave itself do not move with it, but execute an orbital motion which results in their completing their orbit in just about the same place they started.

A similar reaction takes place when you flip a line or a hose—a distinct wave travels its length—but the actual particles of matter forming the line or hose do not themselves change position. Thus a wave is a reaction to a pressure disturbance caused by wind blowing over the surface of the water.

If the boat is not travelling directly down wind you can see how the counter-current at the bow pushes this sideways—aided by the following current at the wave crest pushing the stern the opposite way—combining to form a strong turning moment.

On larger waves the boat is usually in either one or the other of the currents—presenting less turning force. The following currents near the rudder further complicate matters as they are moving in the direction the boat is travelling, and so reduce the actual speed of the water passing by the rudder—which can result in a considerable decrease in steering efficiency.

Other factors contribute to the development of a broach. If the bow is indeed dug into the water ahead, the centre of lateral resistance moves forward, and the boat tends to pivot about the bow. There is also the weather-cocking effect of the wind on the sails—when running or broad-reaching the mainsail can partially blanket the jib—moving sail pressures aft and tending to turn the boat into the wind.

You will note in the illustration how the jib may be fastened to the bow of the weather float—giving it maximum exposure to the wind and thus maintaining proper sail balance.

There is a marked difference in steering skill among even experienced helmsmen. Some may practically never allow their vessels to broach—while others have this humiliation repeatedly thrust upon them.

The difference in skill lies in anticipation of an incipient broach. The sensitive helmsman will recognize the possibility, and will straighten the boat to a more direct-down-wind heading until the danger eases. He will do this perhaps instinctively, and can be amazed when the same boat broaches with another at the helm—after the first man had privately decided that particular vessel was broach-proof!

The Skipper was horrified on the completion of a deep-sea trip to hear one of his mates complain to a stranger that "the boat was fine—but she broached."

The boat had indeed broached—but only twice during the sailing of several thousands of miles—each time with the relatively inexperienced man at the tiller.

Another example of experience versus inexperience occurred during a run down the California Coast. Rich Gerling had joined the ship just North of San Francisco—and had so much fun in the surfing conditions then present he refused to surrender the wheel for five hours.

The boat was going like a train of cars—and everything was lovely. There was apparently not the slightest tendency to broach—probably because as an experienced helmsman he was making the proper correction movements without even realizing it. Within several minutes after he relinquished the helm to another crew member —away they went in a wild broach, with the helmsman white with terror!

A broach in a properly-designed trimaran is safer than the same manoeuvre in any other type.

Overwhelming broaches have been experienced—without even any water on deck!

Of vital importance to proper performance is the tuning of the trimaran. The boat might go nicely indeed when off the wind, but in order to be efficient to windward everything must be exactly right.

The sails must sheet home properly; the jib must be taut along the foot as well as along the leech, the mainsail must likewise have a taut leech, and be sheeted within a foot or so of the centre line.

Making certain the jib (or genoa) is sheeted properly is an interesting task. You will note in the drawing the 12-degree line which begins at the base of the jib stay and runs aft. This is measured from deck centreline.

Both the jib sheet block and the genoa sheet block (or winch) will be somewhere along this line. The distance is dependent upon the cut of the sail itself. In general, the sheet will be an extension of the mitre of the sail. Hoist the sail (preferably in windless conditions) and pull the sheet aft in line with the miter. Where it touches the 12-degree line will be approximately the proper position for the block (or winch). The tack (forward lower corner) of the sail should at this point be about 18 in. above the deck. By moving the sail up and down the stay an exact fit may eventually be made—but first the boat should be sailed.

The headsail will be properly sheeted when—upon coming about—the sail breaks both above and below the miter as it starts to luff.

Dear John,

In planning your self-righting multihull, I believe there should be an interim consideration. This has to do with the period between the moment of capsize and righting efforts—if indeed the latter does not proceed automatically. As we may assume the capsize occurs in stressful conditions the crew needs to be sustained until righting efforts may be carried out. Whether this means access to the hulls when bottom up or some means of attachment of a shelter (floating or otherwise) I am not certain.

As regards the Crystal Trophy Race—I sailed *STILETTO* 10,000 miles to compare her performance against the World's fastest multihulls, and as the first two legs were ideal for comparison, such comparisons should be made as many people are interested. No Nicol design was entered, although it may be significant that the Australian *STILETTO* (Ken Berkeley's *VIVA*) in the windy 1967 Brisbane-Gladstone Race finished five hours ahead of the second finisher—a Nicol design—which finished two hours ahead of the first monohull. In the previous same race Nicol himself beat the first monohull by one and a half hours.

You have stated that although our deep-V floats might be the most easy riding, they cannot be as fast and therefore our designs cannot be as speedy as (1) Nicol's; and (2) Kelsall's.

How do you square this statement with the actual facts as demonstrated in the above races? I can't see how you can say anything other than *STILETTO* is apparently the fastest sea-going multihull—at least on an overall-length basis.

This should make *SHTAR* even more interesting, as it seems obvious nothing has a chance against *PEN DUICK* except a multihull.

ARTHUR PIVER

## MULTIHULL VS MONOHULL

BY

JOHN MORWOOD

For the first ten years of the A.Y.R.S. life, we studied multihulls of all types (amongst our other work), merely making suggestions for their improvement and one of the results of this was the development of the modern trimaran for which I think we can be said to be responsible. Last year, however, we felt that our kindly attitude had to stop in view of some capsizes of cruising catamarans and trimarans and a search was started to find faults—a process which we are continuing.

Let us now list the advantages and disadvantages of multihulls in comparison with single hulled boats.

*The Advantages of Multihulls*

These are as follows:—

1. Faster than single-hulled boats of the same length.
2. Very much cheaper so one can have a larger boat.
3. They sail upright which pleases the ladies.
4. They have a large deck space which is very nice in harbours.
5. They have a very shallow draught.
6. They are easy to work and sail.
7. They are very much lighter in weight.
8. Their ability to withstand a blow by flotsam or a rock is far greater because tons of lead and structure are not behind such a blow and the light weight can be easily stopped in its movement.
9. Even if holed, they are unsinkable and many have sailed back to port with hulls or floats full of water.
10. Hard chine, easily constructed shapes are fairly fast so amateur construction is very frequent, using sheet plywood.

*The Disadvantages of Multihulls*

1. They are capsizeable, like square rigged ships, Thames barges and Dutch Botters, and all shallow draught boats such as the traditional work boats of Eastern America, for example the *CATBOAT*. However, we in the A.Y.R.S. are convinced that this can be "designed out" and we are working to this end. Indeed, we may already have solved it with the hydrofoil-stabilised, minimum ballasted hull.

Some multihulls are more capsizeable than others, the secret being to have above-water buoyancy high up and far out. The trimaran usually scores here from its float shape but James Wharram's catamaran designs must have a very useful stability curve.

2. Excessive beam, especially in trimarans. John Westell's *OCEAN BIRD*, and *MATAMONA*, however, can reduce their beam in harbour by swinging the floats in to the side of the main hull—a feature first developed to my knowledge by "Andy" Anderson in the *SHARK* trimaran, which appears to be relatively the fastest sailing boat in the world.

3. The first trimarans carried the main beams right across the boat, so one needed to duck under this when going forward. Modern designs no longer have this feature.

4. Some designs have places which are hard to get at, especially in trimaran floats. These should be filled with foam-in-place plastic but often are not.

5. People complain that few multihulls, especially catamarans, "look like yachts." Catamarans often have ugly big boxes on their bridge decks for accommodation but these are not necessary. With proper "Styling" by a designer with an artistic eye, all multihulls can look very pretty. It is up to the eye of the beholder whether or not he likes the result or if he think it "looks like a yacht." James Wharram has no accommodation on the bridge deck, except in port when he uses a tent. At sea, all the accommodation is in the hulls which he regards as a safety factor. Trimarans can use the depth of the main hull and hence need not be "built up" as much as catamarans to get full headroom.

*Comparison of Multihulls and Monohulls in Yachting Accidents*

In YACHTING MONTHLY of November, 1963, there was a most fascinating article by Peter Tangvald, describing 180 yachting accidents. Let us now see how the multihulls would fare in comparison with the single-hulled yachts studied. In the right hand column I

give my own estimate of how the multihulls would save or lose lives and yachts.

| *Loss of Life* | *Single-hulls* | *Multihulls* |
|---|---|---|
| Part of crew drowned when yacht is lost at sea | 18 lives, 5 yachts | 7 lives, 2 yachts<br>Does not sink |
| Lost with all hands | 9 lives, 4 yachts | 4 lives, 2 yachts<br>(capsized and not found) |
| Drowned falling overboard | 5 lives, 5 yachts | 2 lives, 2 yachts<br>large and level deck |
| Swimming to shore from disabled yacht in heavy weather | 7 lives, 2 yachts | 5 lives<br>More hope due to shallow draught |
| Struck by lightning | 4 lives, 1 yacht | 4 lives, 1 yacht |
| | 43 lives, 17 yachts | 22 lives, 7 yachts |

| *Loss of Yacht, No Lives Lost* | | |
|---|---|---|
| Failure of anchor and/or cable | 19 yachts | 4 yachts<br>Shallow draught |
| Stranding | | |
| (a) Navigational error | 14 yachts | 3 yachts<br>Shallow draught |
| (b) Poor seamanship | 11 yachts | 3 yachts<br>Shallow draught |
| (c) Exceptional conditions | 2 yachts | 1 yacht<br>Shallow draught |

| *Loss of Yacht, No Lives Lost* | *Single-hulls* | *Multihulls* |
|---|---|---|
| Fire: | | |
| (a) Petrol or bottled gas | 8 yachts | 16 yachts<br>More outboards used |
| (b) Electric short-circuit | 1 yacht | 1 yacht |
| Foundering at sea | 10 yachts | Nil |
| Capsized stern over bows by following sea | 1 yacht | 1 yacht |
| Falling over when slipping and other unusual causes | 8 yachts | 1 yacht |
| | 74 yachts | 30 yachts |

*Damage to Yacht without Total Loss*

| | | |
|---|---|---|
| Grounding after anchor or cable failure | 23 yachts | 5 yachts |
| Collision or dragging in port | 18 yachts | 4 yachts |
| Fires: | | |
| (a) Paraffin | 8 yachts | 8 yachts |
| (b) Cigarettes | 8 yachts | 8 yachts |
| (c) Electric short-circuit | 4 yachts | 4 yachts |
| Sinking through faulty W.C. fittings in harbour; each salvaged | 7 yachts | Nil |
| Falling over when slipped | 7 yachts | Nil |
| Dismasting at sea | 6 yachts | 12 yachts Due to extra stability |
| Run down by ships at sea | 4 yachts | 4 yachts |
| Collision with flotsam at night | 4 yachts | 2 yachts Due to shallow draught |
| | 89 yachts | 47 yachts |
| | 180 yachts | 84 yachts |

In my estimation, therefore, if all these yachts had been multihulls, 21 lives and 54 yachts would not have been lost and 42 yachts would not have been damaged. These are powerful words. So I have to analyse my bias.

I can assure my readers that I am a single-hulled man. My two greatest yachting pleasures are beating to windward up a river and running before a pleasant swell in a moderate wind, both in single-hulls. My estimation above is therefore one of reason and not the emotion of so many multihull protagonists.

*Conclusion*

Multihulls, despite the possibility of capsize are far safer than single-hulled yachts. They are faster, cheaper and more comfortable and pleasant to sail with. Within the next very few years, hydrofoils will enable capsizing to be "designed out" and the resultant boat will be even faster, cheaper and safer than the multihulls of today.

## MULTIHULL DESIGNER'S RACE

BY

ARTHUR PIVER

What promises to be a significant yacht race is projected for mid-Summer of 1969, when Sydney, Australia will be the scene of the start of a contest which will span the almost limitless watery wastes of the "Roaring Forties."

It is expected that speeds may exceed any ever recorded by sailing vessels—for the contestants will be craft which for the first time have the ability to travel as fast as the waves themselves. These are multihulls—catamarans and trimarans—which can surf large following seas like surfboards; remaining on a given wave until it dissipates. As waves in the 40's are said to travel at a 25-knot clip, faster runs than the 17-knots-plus (for 24 hours) of the mighty American Clippers of one hundred years ago might be made. Question mark is the degree to which individual waves persist. Authorities are now divided on this question—some maintaining an individual wave may last for thousands of miles; with others claiming a duration of but minutes. The contest should settle this problem; for the usual vigorous Westerly winds in these Latitudes are expected to prevail.

Finish line will be at Buenos Aires, in Argentina, with the Race Regulations calling for Cape Horn to be left on the Port Hand. Starting arrangements will be under the auspices of the Trimaran Yacht Club of Australia; with finishing duties being handled by the Asociación Argentina de Multicascos. A suitable trophy for the first finisher has been pledged.

Unique feature of the Contest is the requirement that one of the two-man crew shall be the Designer of the vessel—with this provision waived for the second and additional boats by any one designer. Start of the Race is scheduled for Noon, February 15, 1969.

## MULTIHULL PROCLAMATION

Whereas various designers of multihulled sailing craft are in disagreement concerning claims of seaworthiness and/or speed regarding their respective creations, it is hereby

*Resolved:* that a sailing race over a representative area would be best settlement of various contentions as above. It is therefore

*Proclaimed:* that such a contest is projected as follows:—

1. Entrants are to have two in crew; including the Designer.
2. Time of Start: Noon, February 15, 1969.
3. Place: Sydney, Australia. Auspices: Trimaran Yacht Club of Australia.
4. Finish: Buenos Aires, Argentina. Auspices: Asociación Argentina de Multicascos.
5. Marks of Course: Cape Horn shall be left to Port.
6. No electronics may be utilized in automatic steering.

*Therefore:* it is incumbent upon designers who claim their boats to be either "seaworthy" and/or "fast" to participate in the above Contest.

*Entries* are to be submitted (before September 1, 1968) to: Trimaran Yacht Club of Australia, Box 35, P.O. Turramurra (Sydney), N.S.W. 2074, Australia.

*Trophy:* Pi-Craft *SUPREME SAILBOAT.* (To first finisher). Plaques to all finishers.

30th June, 1967.

Dear Mr. Morwood,

RE MEETING, 18TH JULY

I am writing to say that I am sorry I will not be available for the meeting on 18th July.

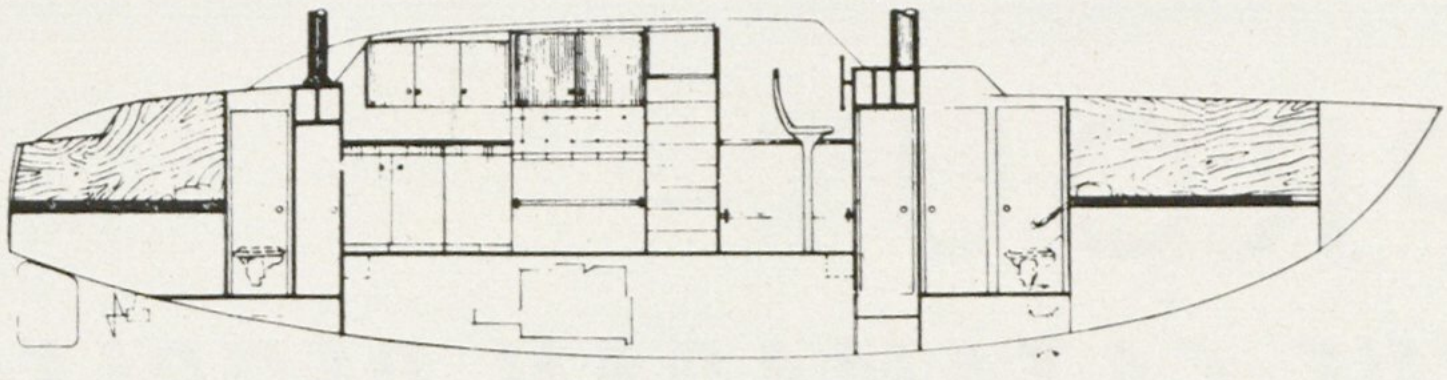
As I was an entrant for the 1964 Single-Handed Trans-Atlantic race (in which I finished 4th in my yacht *LIVELY LADY*), I am very interested.

You may or may not remember that I started last year in an unofficial race to Australia with Chichester but had the misfortune to be run down off Ushant by a big steamer. After getting into Plymouth, further damage by a fall-over in the boatyard put me out for a year.

The yacht is now repaired and I am making another start on July 16th. Please remember me to Howell, Ellison, etc. I would have loved to have been there. Hope you will hear of me from time to time.

ALEC R. ROSE.

Southsea, Hants.



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## RACING MINDED?

In the 1967 Crystal Trophy Race in England the Piver-designed 33′ STILETTO was far faster than anything else near her size (in the speediest sea-going multihull fleet ever assembled) on the first down-wind leg; and on the wild reach to France was one with sufficient stability to carry full sail.

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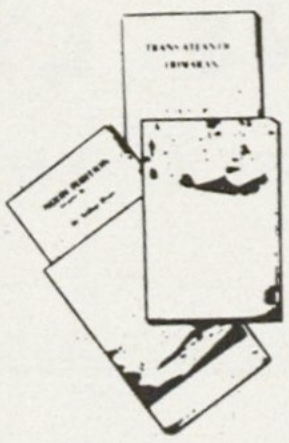

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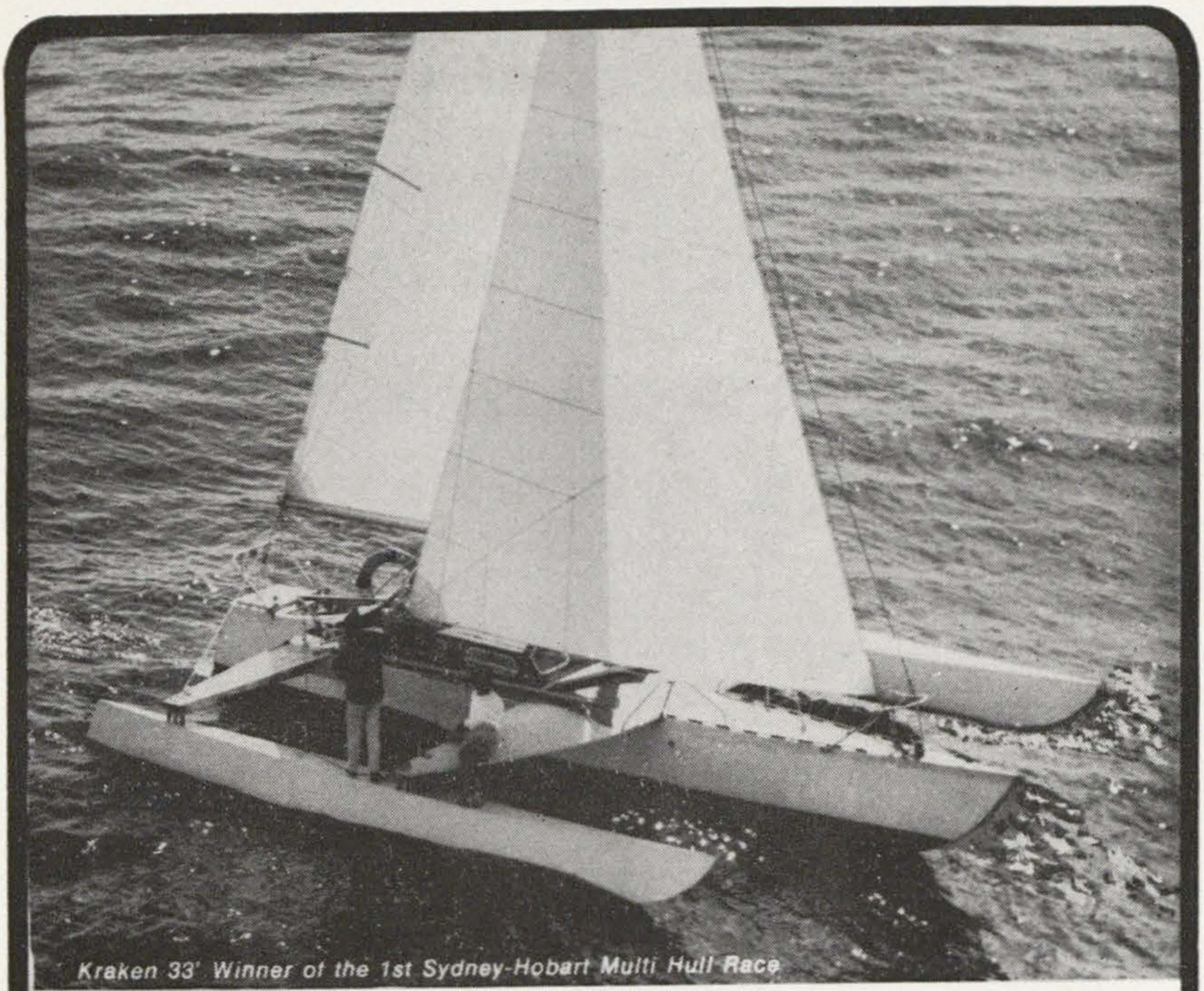

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