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A.Y.R.S. PUBLICATION No. 52

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(Founded June, 1955)

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EDITORIAL

July, 1965.

Ten Years of the A.Y.R.S. The simple survival of the A.Y.R.S. for ten years seems almost miraculous. We have, however, not only survived but have a large and flourishing membership of very interested (and very interesting) members whose numbers are as follows :

British	524
America	273
Australia	70
Canada	41
France	50
New Zealand	70
South Africa	63
Other Countries	130
Total	1221

The A.Y.R.S. accomplishments. The primary function of the Society has been the production of the publications. With these, the system of making a "Symposium" or study of one subject in each has proved very successful because members specialising in each feature have been able to see each year the new ideas which have come forth. I think that the A.Y.R.S. itself has been the means by which this advance has been possible. Let us now examine what we have done.

Catamarans. Woody Brown and Alfred Kumulai followed by Rudy Choy, Warren Seaman and Alfred Kumulai paved the way for the modern catamaran. The present modifications of the first *Manukai* show a delightful, fast and seakindly catamaran capable of crossing oceans. Experience has shown, however, that the shape they have devised does not make the fastest inshore racing catamaran. Roland and Francis Prout, with their *Shearwaters* led the breakthrough here and in the opinion of many the *Shearwater III* is still the fastest racing catamaran of her size in the world.

In this field, the A.Y.R.S. has functioned as the forum for opinions and for designs of catamarans so that new designers could benefit from the work of others. We feel that our contribution to the design of the modern racing catamaran has been of great value to designers while the large cruising catamaran with a semi-circular underwater section, so successfully produced by the Prouts and MacLear and Harris has been advanced by years through our efforts.

Trimarans. The A.Y.R.S. only functioned as an "Uncle" with the catamaran, advising and suggesting but it had a much more the function of a "father" in the case of the trimaran. It was the study of the native Indonesian double outrigger and its interpretation in terms of sheet plywood, especially in the designs in publication No. 18 (*Parang, etc.*) which triggered off Arthur Piver's designing career, from which all the modern trimarans have been stimulated. We must, of course, acknowledge the very nice trimarans made by Victor Tchetchet before the advent of the A.Y.R.S. such as *Egg Nogg*, and *Flamingo*. It so happens, however, that they did not directly contribute to the modern trimaran as they were unknown outside of their own area. Despite the sterling work done with the *Shark* trimaran at Shoreham, England, I think we are still waiting for the ideal float and foil combination for the racing trimaran.

Single Outriggers. Whether Polynesian or Micronesian, this type is still awaiting development. It seems more than likely that the Polynesian outrigger will eventually prove faster than the catamaran and no catamaran racing rules (except for one design) bars them. Again, the A.Y.R.S. has shown the way (Bruce, Partington, No. 51) both with and without hydrofoil. The place of the Micronesian type in the yachting scene is still obscure.

Hydrofoils. Edmond Bruce and others have shown how hydrofoils can be used successfully as stabilisers and this aspect will get more and more attention from now on. However, from amongst the A.Y.R.S. writings on the subject someone could already pick out a configuration which would produce a successful "Flying hydrofoil boat" and we hope that this will occur soon.

Technical Studies. We have all been fascinated by the articles of Edmond Bruce, though some of us find them a little hard going. The modern youth, seeing his elders unable to do scientific work unless they have apparatus costing many thousands tends to forget that the pioneer studies in all fields were done by amateurs working at their own expense in their attics. The modern scientific "Status" seems to come from the ability to control public funds, not on the work done. By contrast we wish to state most firmly that the A.Y.R.S. believes that *any intelligent Schoolboy can make a worthwhile study of any scientific aspect of sailing he wishes without undue financial cost.* To the criticism that the A.Y.R.S. yacht wind tunnel would become "A plaything for uninformed amateurs", we pose the question "What have the professionals *published* as a result of the millions of money which they have absorbed for yachting research?" Let us set the two down side by side.

Professionals	Amateurs
1. Stevens Institute Memoranda.	1. Bruce reports in the A.Y.R.S.
2. Y.R.C. Papers (not available)	2. Harrington Hudson in the A.Y.R.S.
3. Marchaj's Book (a semi-professional).	3. William Allen Smith's book.

Undoubtedly, the Stevens Tank and that at Southampton of Saunders Roe can give an accurate performance assessment of a 12-meter hull but there is evidence that the Bruce tank can be equally good. We, in the A.Y.R.S. believe that the day of the amateur is far from gone and would like to encourage every one of our members to take up the study of yachts from the scientific point of view within the level of their abilities.

The A.Y.R.S. Yacht Wind Tunnel. John Hogg has now made a preliminary study of the wind flows in our tunnel at Woodacres and his report follows in this publication. Even without air straighteners, the wind flow has a turbulence almost identical with that of the natural wind but with a constant windspeed. This might indeed be a better way to study sails than with an absolutely smooth air flow but we will provide air straighteners so that we can try both ways. During the course of this summer, he and I will make a study of a model and see what figures we produce.

The A.Y.R.S. Bruce Tank. This laminar flow tank is still extant and could be used to develop yachts and study performances. Perhaps what we need is a room in London in which to get it going. Edmond Bruce himself continues his studies but the "know-how" which he has developed over the years should be taken up by people in many different centres to get the most out of it.

Socially. The lectures and films shown in London this last winter have been a great success. They were as follows:

1. General Parham's film on "*Windflows*"—a delightful introduction to sailing aerodynamics without effort.
2. John Fisk gave us a very interesting talk on *Catamarans.*
3. Members films were very interesting. Film of Catamarans, trimarans and surboarding in Hawaii were shown.
4. John Hogg made the subject of *Performance Figures* interesting and, believe it or not, amusing. He showed us his recording apparatus, including his "Bubble gun".
5. Christopher Hook spoke on *Hydrofoils* and showed us his films.

These meetings were organised by Lloyd Lamble and enjoyed by everyone, even non-technical members.

The Weir Wood *Sailing Meeting* was an outstanding success last year where we could all see the "Brain children" of our members. This was organised by Fred Benyon-Tinker who runs a Sussex group with regular meetings. There will be another meeting next October, and a race for the model yachts of our competition may be run.

This summer Michael Henderson will be running outings to Southampton University and the National Physical Laboratory and there may be a meeting at Woodacres to show a model run through the A.Y.R.S. wind tunnel.

Summary. The A.Y.R.S. is a very vital organisation which is pushing forward the practical development of new kinds of yachts and pointing out the lines which members could use to increase sailing speeds. We are trying to encourage the scientific study of yachts in all ways possible and providing social and educational meetings for the enjoyment and instruction of our members.

Your Editor's Personal Yacht. The A.Y.R.S. gives pleasure to many people and this no doubt is a good thing but, as with most things, the work your Editor does for the A.Y.R.S. has a personal motive. I want to own, eventually, the most *efficient*, *seakindly*, *easily handled*, *and fastest cruising yacht* which will ever be devised. The rules for the design which I have produced so far are as follows:

1. As long as I can afford, in terms of money and work (36 feet)
2. As narrow as I can live in with 6 feet of headroom (6 feet).
3. As shallow draught as I can have (2-3 feet)
4. Self righting by means of ballast and semi-circular deck.
5. Upright sailing by means of one or two hydrofoils.
6. A rig which can be completely worked from *below* decks. My present ideas centre about a ship rig with semi-elliptical square-sails on three masts. However, I may settle for a brig.
7. Self steering—possibly the "Mill gear".

I am about to start building a model of this boat and hope to enter it for our model competition to see how it goes.

Yachting in Ten Years Time. As I see it, people will be scooting around at 40 or 50 knots on lifting hydrofoils. The C Class catamaran will have been replaced by the single outrigger as the "supreme type" while the catamaran will be regarded as we at present look at dinghies, pleasant but dull. Trimarans and catamarans will be cruising inshore and across narrow waters while foil stabilised single hulled craft will cross oceans, on one of which I will be myself. No doubt, the R.O.R.C. and C.C.A. will still exist. I wonder what kind of boats will be winning *their* races ?

THE A.Y.R.S. CHAIRMAN, R. S. WADDINGTON

It is a great pleasure to me to congratulate the A.Y.R.S. on its tenth birthday. I joined the Society at the Boat Show in 1962 because I felt that it either had the answers to all the things I wanted to know about sailing or was doing its best to find them. I soon found myself down at Woodacres painting the yacht wind tunnel with Pat and John Morwood, and discussing the A.Y.R.S.

At that time, the A.Y.R.S. was being more or less entirely run by John Morwood, though Hetty Tett had taken up the secretarial side. As with many societies started and run by one person, John had found that the novelty had worn off and the routine work was absorbing so much of his free time that he could not extend himself any further to run meetings or even do any research. The only activity of the A.Y.R.S. at that time, other than the publications were the meetings run by Fred Benyon-Tinker and Dennis Banham in the Redhill district and the sailing meetings at Weir Wood.

In order to take as much of the burden off John as possible, it was therefore necessary to get an organisation started where the Committee would be actively working to do all the things which make an *active* Society and one which makes an impact on the minds of yachtsmen. As you know, we took the appropriate steps and the A.Y.R.S. became a "Limited Liability Company" with *Articles of Association* on 19th December, 1963. The "Directors" of this Company are, of course, the A.Y.R.S. Committee whom we selected with considerable care as people who would be prepared to give their time and energies to further the work of the Society.

I think that the result has been outstanding. Fred Benyon-Tinker and Dennis Banham's meetings are still very successful while the Weir Wood Sailing Meetings become better every year. Lloyd Lamble's general meetings in London have been an outstanding success with members in many parts of England, Scotland and Ireland organising local meetings as a result. Michael Henderson and John Hogg are in the process of organising visits to Southampton University and the National Physical Laboratory which will let us all see the fascinating things which go on there. These are the items which are of direct interest to members but other, less spectacular things need to be done such as organising the Boat Show which has been taken over by Pat Morwood while other matters such as the accounts and a host of others things of a more or less routine nature have to be done and are being done most excellently by the other Committee members. Of course, the main A.Y.R.S. activity of the publications goes on and they appear to be highly appreciated while John Morwood has been synthesising the rules of the Model Cruising Yacht Trials

from the suggestions and advice of the Committee and others. As Chairman, however, I feel that we need still more help on sub-committees and, if any member feels that he has knowledge and time to help us in any of our activities, I should be glad to hear from him.

We recently wrote to all English members asking for suggestions for expanding and improving the A.Y.R.S. Your replies have been carefully studied and we are now preparing a programme of expansion based on suggestions from members.

To my mind, the A.Y.R.S. is a vitally active and useful Society with an excellent Committee. If the next ten years show the same amount of progress as these last ten, the Society will achieve an outstanding position in yachting.

REPORT ON THE WINTER LECTURES AND REGIONAL GROUPS

BY

LLOYD LAMBLE,

89, Alexandra Road, London, N.W.8.

The winter of 1964-5 saw the introduction of a new aspect of A.Y.R.S. activity in the form of a series of winter lectures. The object was to fulfill a desire expressed by many members to get to know other members in person and thereby to cement the somewhat loose structure of our Society. That the undertaking was a success is illustrated by the attendances which, on every occasion, far exceeded the numbers we expected. It was felt that 20-30 members would be as many as we could expect, whereas the average was in the region of 70 or 80, with a bumper occasion on the eve of the Boat Show (members film night) when some 200 members and friends packed the meeting.

Each evening was planned to start with a short lecture or film of 30-40 minutes duration with questions and answers to follow; the latter merging into General Discussion. Drinks then made their appearance and the discussions continued until about 10.30 or 11 p.m.

Lecture One was a short sound and colour film on "*Airflow*" by Major General H. J. Parham and was held aboard *H.M.S. Discovery*. We were unable to have *Discovery* for more than one night so we then went to the *Naval and Military Club* where the four remaining evenings were held.

Lecture Two was a talk on the history of Catamarans by John Fisk.

Number Three was a series of films made by A.Y.R.S. members which, whilst interesting and informative, was nevertheless too long (owing to incorrect timing of the films by their proud owners).

The February meeting, held as usual on the first Tuesday of the month, took the form of a lecture by John Hogg on the subject of the measurement of yacht performance—a difficult subject ably and clearly outlined by the speaker who also provided several drawings and working models of measurement devices most of which can be home made. We hope to have an article on these in the course of the year.

The final get together was in March when Christopher Hook, of whose work you read in the April publication, showed films and spoke about the history of several types of Hydrofoil Craft, a subject on which he is a world leader.

The Committee wishes to thank formally all those who spoke, who loaned and showed films and generally assisted in making our first Winter Lecture Series such a success.

This, however, was just a beginning and out of this idea has grown a new development, the formation of "Regional Groups." This departure was the result of much disappointment by A.Y.R.S. members who were unable to attend the London lectures.

After a call for volunteers, some fifteen members offered to act as Secretaries for their respective regions with the result that we hope shortly to have active A.Y.R.S. Groups in:
Bristol, Chesham Bucks, Dublin, Edinburgh, Gorleston, Leeds, Linlithgow, Manchester, Newton Abbot, Sutton Coldfield, Wadebridge, Warrington, Wolverhampton. (Some of the offers were duplicated in some areas).

By now, these Regional Secretaries will have received lists of A.Y.R.S. members within a radius of some 20-25 miles and preliminary meetings may have been held already, preparing the ground for next winter. Some of these Regional Secretaries are terrifically keen; some are holders of important scientific posts; some are armchair sailors but, from a mixture of suggestions from the Sub-committee on Regional Groups (recently formed) and ideas from each Regional Group concerning their own desires and problems, we look forward to some interesting and perhaps startling results. It is anticipated that Regional Secretaries will correspond with one another on their own developments, whether purely Social or Scientific (one Group has computors available!). From last winter's beginnings, through next winter's developments, who knows where our Society may go? For the Regional Groups idea could extend to all parts of the world (there are already active Groups in New Zealand and Australia and many offers from America). Whilst some Groups will grow and others die, the A.Y.R.S. can and must remain a vital force in yachting thought and practice throughout the world.

THE AYRS IN THE USA

BY

W. DORWIN TEAGUE

415 Madison Avenue, New York. 10017.

On January 22, 1965, a small meeting of a few members living nearby was held at the New York Yacht Club to see what could be done about once more getting the U.S. Section re-activated. Present were : Edmond Bruce, William S. Cox, Cyrus Hamlin, Robert Harris, David W. Hubbard, Jerry Hubbard, D. P. Keily, Bruce Larrabee, Frank MacLear, Henry A. Morss, Jr., George W. Patterson, Dr. Gifford B. Pinchot, William Ellery Smith, John O. Stoddart, John H. Thomson and the writer.

U.S. membership has seriously declined and apparently the main trouble is a lack of any central focal point. Since Walter Bloemhard's resignation as President of the U.S. Section, there has been no consistent leadership and many members were lost. The main subject of the meeting consequently was how best to correct this situation.

One conclusion reached was that, at least for the time being, the U.S. Section of the AYRS should accept Dr. Morwood's kind offer to handle the mailing of the Bulletins directly to U.S. members rather than to have them distributed from a central point over here. It was also agreed that memberships and dues should be handled the same way; directly with Dr. Morwood.

The question of a central mailing address was then discussed. After a certain amount of polite side-stepping by all hands, the writer finally agreed to act as the central communications point. This has now been carried a little further and I have agreed to assume the title of the U.S. Secretary, at least for the time being. This decision was arrived at after a discussion with my own hard-working secretary on whom the main burden of the task will fall.

So, for the present, the Secretary of the AYRS for the U.S.A. is:

W. Dorwin Teague
415 Madison Avenue
New York, New York 10017

In my absence, any details can be taken care of by my secretary, Mrs. Mary Smith, at the same address.

A high point of the NYYC meeting was a description by Bill Cox of some tests on "*American Eagle*," unsuccessful America's Cup defense candidate, after she was eliminated from competition. A triple pitot-tube rig was suspended in front of the bow (under supervision of MIT hydro-dynamics people) by which leeway could be

determined to a high degree of accuracy. It was learned, with no question or doubt, that leeway while hard on the wind under good conditions was one and one half degrees or less; this as opposed to the model basin predictions of three degrees to four degrees. This erroneous assumption, as a result of the model tests, caused the designers to provide considerably more keel surface than was actually necessary which, of course, raised friction drag with consequent loss of performance.

Rod Stephens, in an earlier talk at the NYYC, also stated that he felt that "*Constellation's*" leeway was actually far less than the model tests had predicted. In the same talk, he stated that "*Constellation*" was tacking consistently in sixty degrees and if pinched a little could tack in fifty-five degrees if need be.

Harry Morss sends the following:

"To me, the AYRS has brought both pleasure and stimulation, has opened new vistas of interest. The technical side of sailing, which I had never tried hard to understand, proves to be within reach and altogether fascinating. There is even the possibility of contributing to it !

"Edmond Bruce and I seem to be embarking on a project to measure the performance of full sized boats. If we ever get results which appear to be of sufficient interest, we shall offer them to the AYRS for publication."

Walter Bloemhard writes from The Hague in Holland that he may be coming back to the U.S.A. soon.

Bob Harris is editor of a regular monthly column on multi-hulls in Yachting magazine. He is anxious to get any news that would be interesting to his readers.

Dick Newick has sent plans for some very interesting new 26 ft., 28 ft. and 30 ft. trimarans. "*Trice*" has been chartered to a sailor on Cuttyhunk Island for the summer. Jack Stoddart chartered "*Trice*" for a cruise in the British Virgins this winter and is so impressed that he speaks of "*Trice*" as a "break-through."

A few members are making plans to meet at Harry Morss' house in Marblehead in August and it is hoped that other areas may hold meetings from time to time.

For the benefit of U.S. members, the present arrangement is for issues of the Bulletin to be mailed directly from Dr. Morwood in England. Also, dues should be mailed directly to Dr. Morwood rather than to the writer. All of us hope that we can regain the members lost during the last year or so and get in some new members as well. I can supply membership applications for anyone interested.

April 28, 1965.

Dear Sir,

I have been meaning to write again since receiving A.Y.R.S. Publications Nos. 49 and 50, mainly to congratulate you in attaining your half centenary and on the high standard you have kept up throughout. I was particularly pleased to note the reprint of Fred Fenger's work in No. 49. It is nice to know you appreciate his contribution to hull design. It was nice, too, to see reproductions of some N.Z. designs—particularly those of R. L. Stewart.

I like to read of your experiments with new materials and combinations of materials. The Engineering approach has at least two aspects I think—(a) accept what is available and make the most of it, or (b) formulate requirements of strength, weight, rigidity and so forth, and toss these to the materials expert and say "I want a material to achieve this design objective".

I feel that the second approach is by far the most progressive, and in fact is obtaining more and more in industry. Rolls Royce are experimenting with composite materials—the concept of glass-fibres reinforced in a resin matrix is basically good.

Metal strengths are limited by the internal crystalline structure which has inherent faults—the use of metallic fibres with fewer faults in a stabilising matrix may give us very high strength/weight ratios, and reliability too.

CHARLES SATTERTHWAITE.

c/o School of Engineering,
Christchurch, N.Z.

A PROGRAMME FOR THE A.Y.R.S. YACHT WIND TUNNEL

BY

JOHN MORWOOD

The A.Y.R.S. yacht wind tunnel, which cost so much labour to make was opened by Lord Brabazon on Friday, 13th April, 1962. Perhaps this was an unlucky day for it because it has not yet been used. The first trouble was the intrumentation. An investigation into the commercially available scales showed that none were suitable but Norman Naish made some very good ones which we had on our stand at the Boat Show January, 1964. John Hogg got a very nice and useful anemometer for us and work could have started but by this time interest had vanished and only I was available to get the tunnel going. But the A.Y.R.S. has grown to such an extent that it is a job occupying all my spare time as well as some four hours daily by Hetty Tett, without whom the Society would have long ago ground to a full stop. Her voluntary work for us is absolutely invaluable.

Our yacht wind tunnel is therefore ready for work and we have to do our best to get it used. I have therefore been asked by the Committee to draw up a programme for it and we can but hope that someone can find the time to carry out this most fascinating and useful study.

The Calibration. This could take an infinite amount of time but I feel that it would be adequate to study the airflows throughout the tunnel to make sure that there were no large eddies cast from the walls and that there were no large velocity gradient across the width or height of the tunnel. The effect of the natural wind would also have to be examined. Other more refined studies on the actual windflows inside the tunnel could be carried out but I myself feel that they would not increase our knowledge to any worth while extent.

A Model Study. After calibration, as complete a study as possible should be made of the delightful model which was so astutely made for us by Ruth Evans. Windflows around the sails of this model should be studied with a piece of nylon thread on the end of a short stick or wire. Finally, the model should be hitched up to the three scales made by Norman Naish and the forces produced by the sails on every angle from the wind and in as many wind speeds as we can make the tunnel engine produce. These forces should be studied for as many different settings of the mast and sails in the model as we can arrange.

The Time Factor. All this study would take time. A very great deal of information could be obtained by a full time study of two weeks and the value of the tunnel completely assessed in that time. However, with this tunnel, a whole lifetime could be spent in working on specific problems. The various sail rigs which we have been conjecturing and showing throughout these last ten years could be studied and by thought relating to the subtleties, new rigs and sizes of sails could be worked out. Squaresails and combinations of sails could be studied to compare the sail forces produced. The results would be of intense interest to yachtsmen the whole world over and could well influence our thought for ever.

The Amount of Detail. For the purposes of this article, the programme for the wind tunnel need not be worked out in great detail. The use of a wind tunnel is essentially pragmatic. One finds out what works and is useful and proceeds from there.

The Primary A.Y.R.S. Fault. Throughout the whole history of the A.Y.R.S. we have run against people who cannot understand what we are doing, which is not surprising as we barely know what we are doing ourselves and certainly don't know what we are going to do next. Our "Mystique" is that we are open to new ideas and are

willing to wait until we see where they take us. This makes us do things before the "astonished world" is ready to receive them. We seem always to be "before the time". This happened with the catamaran. In 1957, for example, catamarans were being banned from yacht clubs. We pioneered the trimaran when few had even seen a modern one. We are still trying to make people devise a workable sailing hydrofoil boat. Our yacht wind tunnel and our laminar flow test tank lie in idleness because the yachting public as yet do not recognise the need for them. We believe that time will make it necessary for every yacht designer to study yacht hulls in test tanks and sails in yacht wind tunnels. It will, in my opinion, be an uphill struggle to put this idea across in the next ten years. Our job for the present is to get just *one* set of figures from both our test tank and yacht wind tunnel.

THE A.Y.R.S. WIND TUNNEL

BY

JOHN HOGG

Parklands Cottage, Curdridge, Hants.

Here are some notes on the preliminary measurements made in the A.Y.R.S. wind tunnel to assess the air flow conditions at the present time. (April 1965) :—

Conditions.

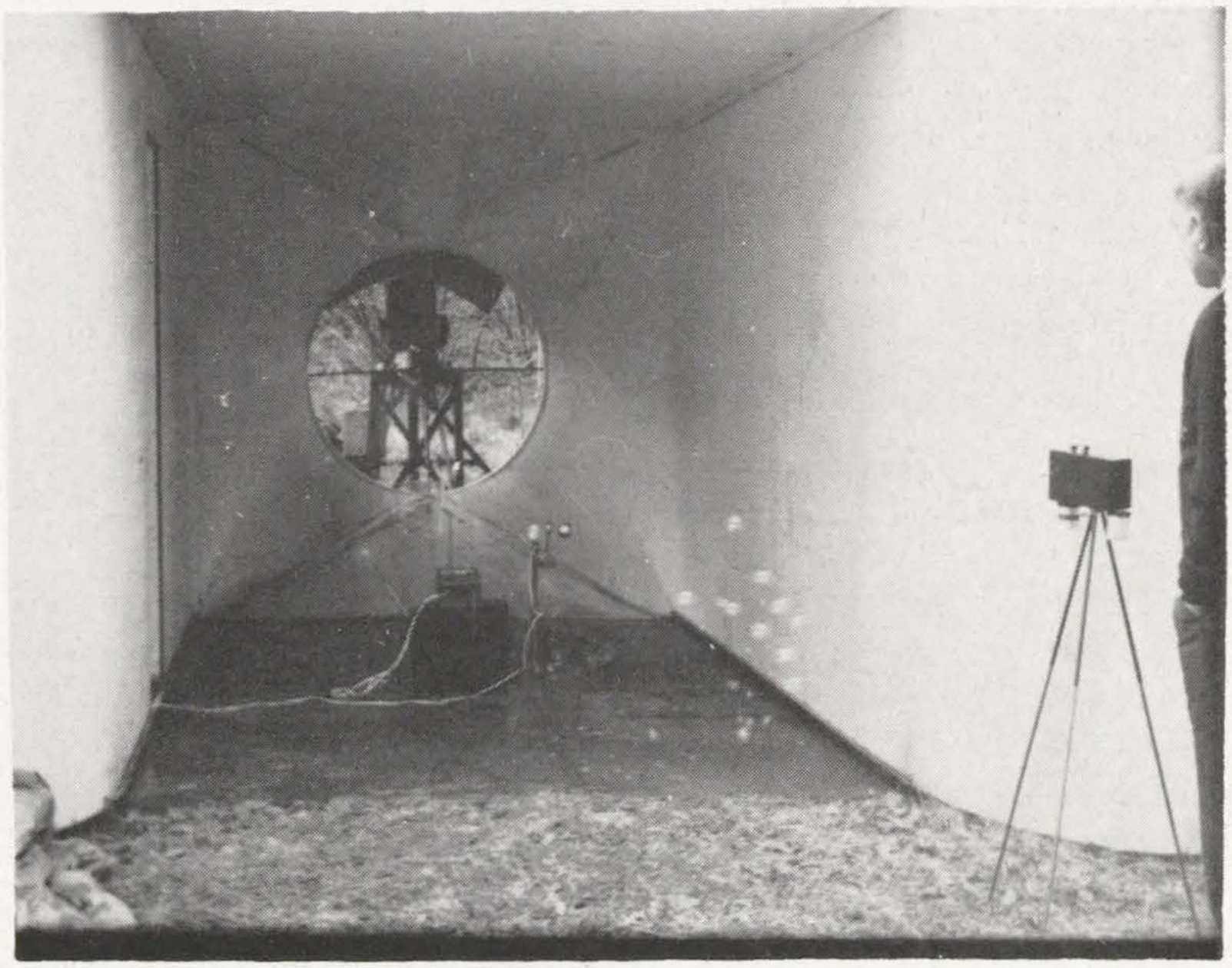
The measurements were taken in light winds. Wind velocities in the area immediately surrounding the tunnel ranged from 0 to 3 m.p.h. In general the surrounding woods screened the true wind appreciably although a greater degree of shelter will occur later in the year when foliage thickens. Such wind as there was moved in the same direction as the tunnel air flow. The tunnel was tested without the use of flow straightening devices.

Tests.

1. *Average Air Speed*, on the central axis of the tunnel. This was measured with a cup anemometer timed over 30 second intervals.
2. *Instant Air Speed* indicated by a light propeller anemometer.
3. *Air Flow pattern.* This was studied with the Bubble Gun, placed at various points in the tunnel, the flow of bubbles being observed on their way through.
4. *Air Direction* as spark recorded by a light vane on a chart (6 in. per min.). The vane was placed at various points in the tunnel to record air direction in both the horizontal and vertical planes.

Method. The tunnel fan was run up to speed and when conditions had settled the various recorders were started remotely via leads brought out by the side door of the tunnel, which was closed.

The A.Y.R.S. Yacht Wind Tunnel.



Using the "Bubble gum."

Recordings from the indicators were read into a tape recorder for subsequent analysis.

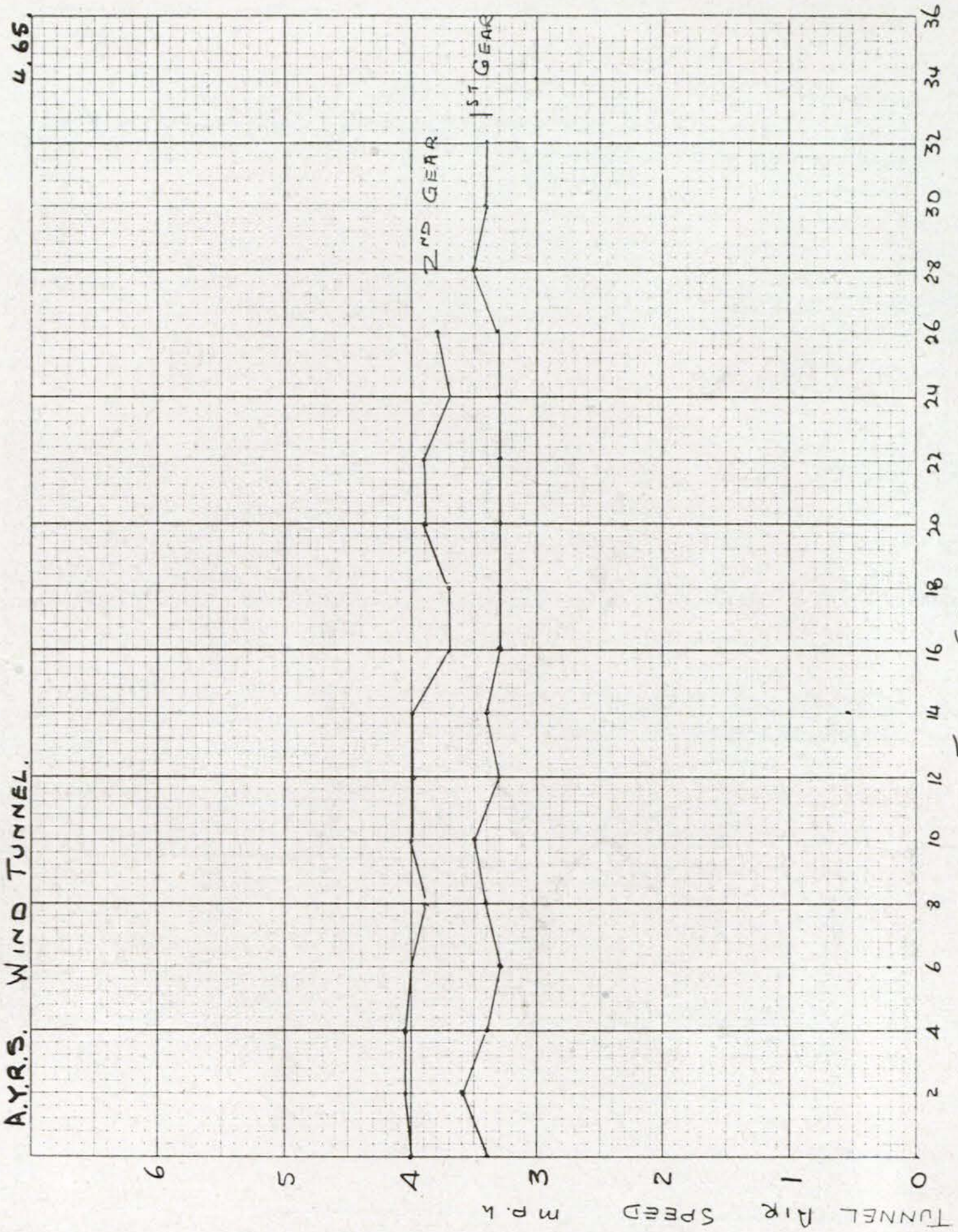
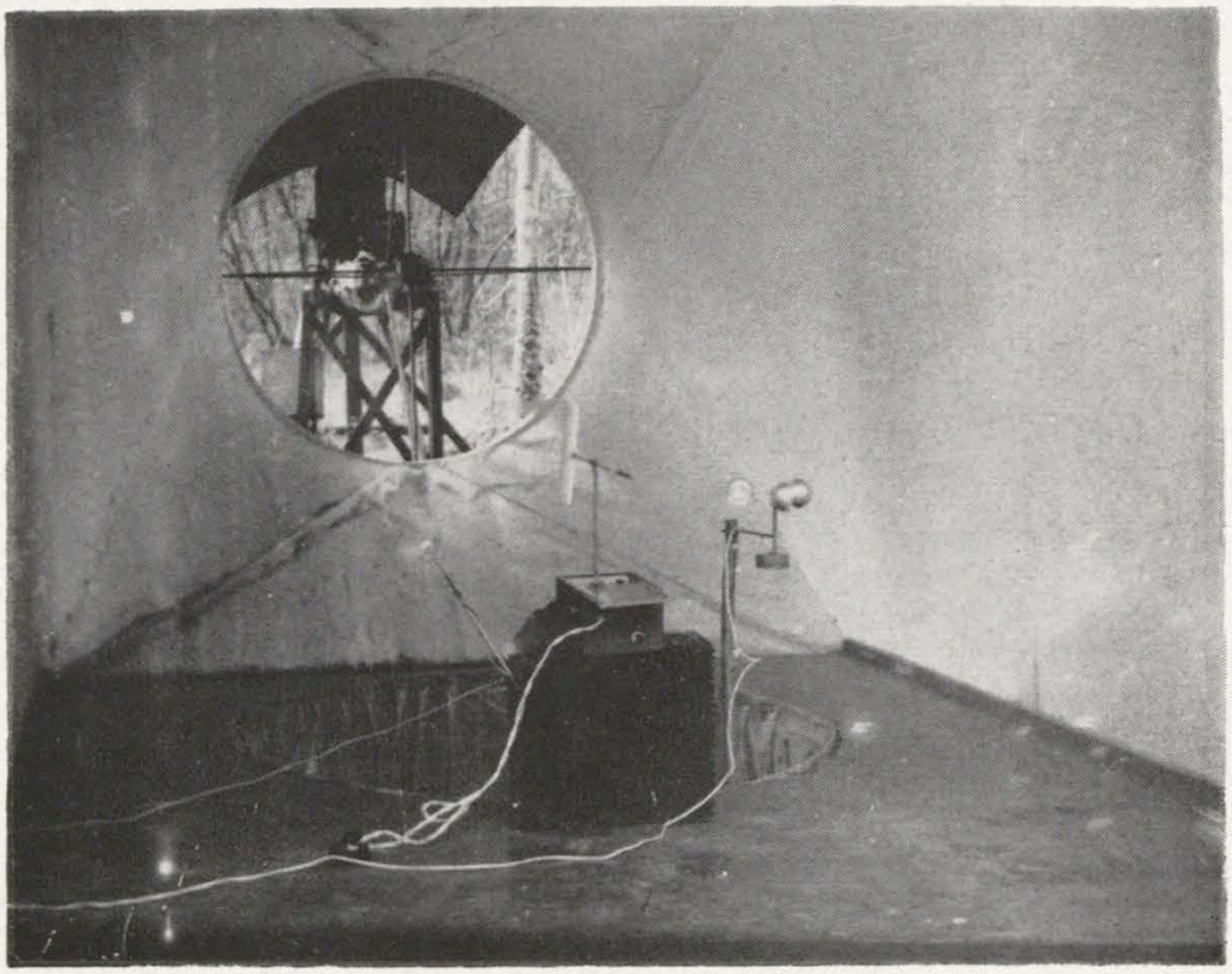


Fig. 1. *The windspeed recording in the A.Y.R.S. tunnel.*

Results.

1. Average Air speed. The average of a number of runs was 3.2 in first gear and 3.6 m.p.h. in second gear. 3rd gear was not used on this occasion.

2. Instant air speed. Fig. 1 shows the variation of flow during a typical run in first and second gear. These are small (3.7 to 4.0) and with the proposed straightening very satisfactory results should be achieved. The speed is low and if the fan can be speeded up to give say 7 m.p.h. this will further reduce the variations and also give a range of air speeds and Reynolds Numbers. The velocity gradient across the tunnel was fairly constant but further checks are proposed when the straighteners are fitted. The discharge velocity of the fan was approx. 18 m.p.h. which was as expected, as the area is one quarter that of the tunnel.



Taking windspeed and direction.

3,4. *Flow.* It is clear that some flow straightening is necessary, although we agreed that the charts showed that a fairly simple system should be sufficient to straighten the flow without unduly retarding it, and this will be tried first. The bubbles showed that there was no noticeable change of flow due to the constriction of the fan casing until a point "downstream" of the model tank although this should again be checked. Fig. 2 shows a length of chart with the vane measuring the horizontal flow variations. They are approx. 50 per cent of those which would be produced by outside winds of similar speeds

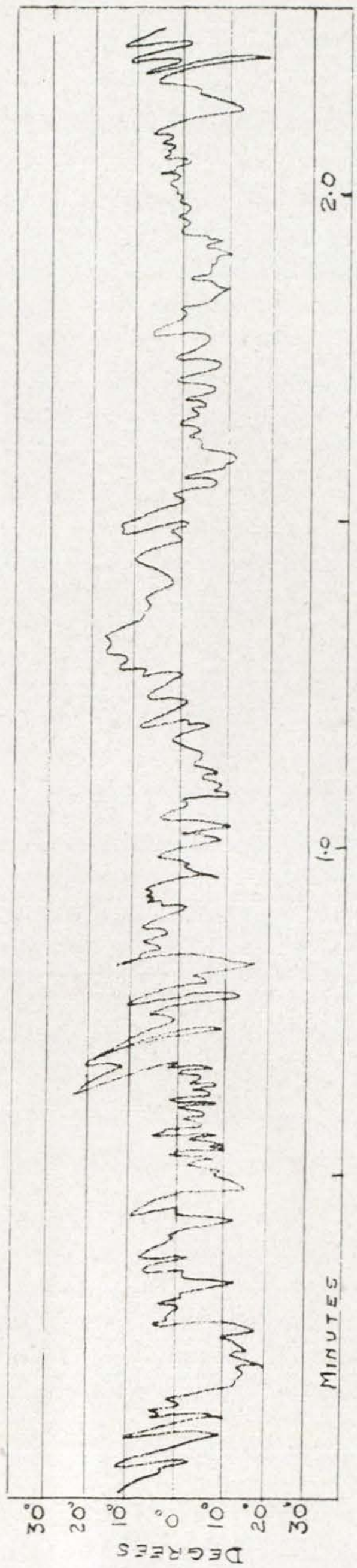


Fig. 2. Deviations in the windflow direction — The A.Y.R.S. Yacht Wind Tunnel.

Summary. With the addition of a suitable straightener useful work can be carried out in the tunnel. The air flow is controllable, though it can, with advantage be increased in speed. The tunnel now needs to be used, even for preliminary experiments. The calibrated scales are available. I do hope that anyone living reasonably near will come forward now and undertake some straightforward sail tests so that the linkage and equipment can be tuned up and some results of practical interest obtained.

Dear Sir,

I have read of the model cruising yacht Competition with interest, but I fear it will not achieve its aim, which is apparently to produce a good four berth ocean cruiser. For to give the three major prizes, totalling £80 for speed, and five minor prizes, totalling only £20 for all the other and, in total, more important qualities, puts far too much emphasis on speed.

Entrants with their eyes on the speed prizes will naturally build the longest model permissable, but 36 feet is not necessarily the optimum or most desired length for an ocean cruiser. Surely, the speed results should have some $\sqrt{L}$ factor weighing ?

The other qualities except speed are very difficult to judge on models. Ship movements are speeded up by scaling down and only a slow motion film of the model can give a real indication of what will happen full size. The behaviour of broken water and spray is totally different on a small scale, as anyone who has seen film sequences of the sea faked, using models, will appreciate.

Structural strength is already admitted to be different on a model scale and a model might be adequately strong when its full-size counterpart would certainly break up. By the same token, ballast to displacement ratios achievable in models are quite impracticable full size.

We shall certainly get some interesting ideas but the speed prizes are likely to be won by models of maximum length and beam, maximum mast height and sail area; either, a great beam conventional hull of large displacement or a ballasted catamaran both with minimum accommodation.

Is that really what we are looking for?

J. SIDGWICK.

Leigh Cottage, Freshford, Bath, Somerset.

Editor: The Committee and our advisers have devised these rules with considerable care. We have, however, written in to them an option for the judges to reduce the prize for unsuitable boats if this should be deemed desirable. We do realise the limitations of the competition but guess that in the first year at least "rule cheaters" will be unlikely. However, my own view is that we should encourage "rule cheaters" as the trials will be a very severe test for the models.

We think that the majority of models will be specifically made for our Competition. Therefore, the overall length is quite arbitrary as the scale of 1 inch to the foot could be altered when building the full

scale scraft. We chose 36 feet because this was the length of Slocum's *Spray* and for no other reason. When making any development, one should surely start from the very well known. It would not have been impossible to use a $\sqrt{L}$ factor and have handicapping. It should not be necessary, however, and we decided against it.

In our prizes, we have given the greatest emphasis to speed largely to reduce the subjective judging which is necessary with other qualities. Mr. Sidgwick is quite correct that ship movements are speeded up with models and this will make judging sea motion easier for us. However, pitching movements depend not only on hull shape but also on the disposal of weight, fore and aft.

As stated, the full size boat would certainly break up if built as lightly as the model we expect to win and ballast to displacement ratios will not be achieved but to a certain extent this will be taken care of by the greater wind speeds at which the full size yacht can sail. Obviously, the model will have to be re-designed before construction at full size.

Undoubtedly, the speed prizes will most likely be won by the longest model with maximum mast height and sail area and minimum accommodation, though these are all specified. We have not specified beam, however, as we think this is a self limiting factor with single hulls which get very narrow till checked by the accommodation requirement while multihulls will get very beamy to avoid capsize of the model, when gusts of wind come.

The progress of yacht development is exasperatingly slow. Models are cheaper than full size yachts and we believe that they can help us to find our ideal yacht. We can actually see if the cruising trimaran or catamaran, carrying a load is in fact faster than the conventional yacht with the same load. We want to allow all types of rig and hull with any kind of stabilising device imaginable. Therefore, we want as few rules as possible and I believe that we have evolved the minimum. If, as a result of experience, we find one type of yacht winning all the races, let us not ban that type of yacht but place it in a separate Class so that our rules can remain as open as they are at present.

The three entries to date are: 1) A model of Joshua Slocum's *Spray*, with a wishbone rig entered by Lloyd Lamble. We hope this one will always compete in our races. 2) A "conventional" model yacht built by John Fisher, the Hon. Sec. of the Thames Shiplovers Society and 3) A *Perlorus Jack* type of model with three squaresails, built by your Editor.

TRIM—A TRIMARAN

Designer and Builder: A. KANSSEN, 17 Crossways, Beckenham, Kent.

When I decided to build a boat, I wanted a trimaran small enough to manhandle and sail single handed, and yet roomy and safe enough to use as a family boat. '*Trim*' was built completely single handed and has an overall length of 13 ft. The beam is 7 ft. 6 in.

The main hull has a 90 degree angle section forward of amidships, where a chine starts, and extends at about waterline level to the transom. It has a fairly deep rocker. The cockpit has a flat floor measuring 6 ft. x 3 ft., the space below being filled with polystyrene foam for buoyancy. There is another buoyancy compartment in the stem, the floats and wings are also filled with foam. There is a large locker below the after deck and a smaller one forward.

The wings are of a simple box construction and are integral with the floats. They are extended inboard fore and aft where they are bolted to the main hull. They are also connected in two places along the gunwhale. The floats are asymmetric and are 7 ft. 6 in. long Except for close to the bows they are flat on the outside, and have a 30 degree deep vee section. They are sloped inwards so that the inboard surface is at 90 degrees to the underside of the wings. They are slightly toed in.

I am using a Solo sail giving 90 sq. ft. area. The swivelling mast is stepped onto a piece of sail track to give 15 in. fore and aft adjustment. The shrouds are adjustable in an unusual way. They are attached to a tang which slides in a track on the forward part of the mast at the hounds. This tang has a 3 part tackle fastened to it with the tail passing through the mast, down to a cleat at the base. The forestay has a separate fixed tang, and is secured by a simple lanyard at the base Thus, the mast may be simply adjusted for position or rake, and the tension of the shrouds can be altered while the boat is under way.

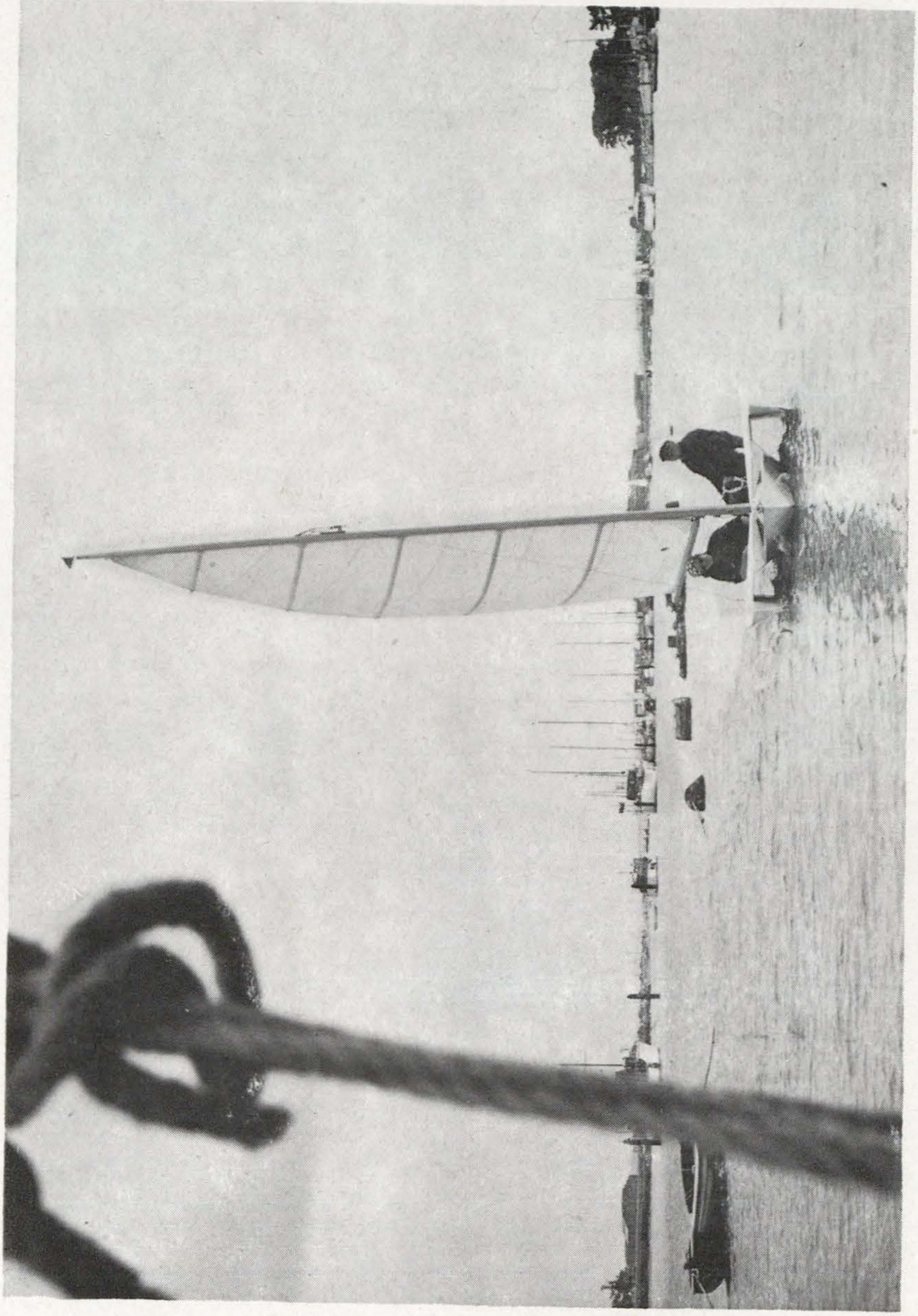
So far, sailing has been done in fairly light winds, the strongest being only force four.

'*Trim*' points reasonably well, and excessive leeway can be eliminated, provided that the lee float is heeled.

Due to the rocker, '*Trim*' goes about as easily as a conventional dinghy.

Off the wind, it is possible to plane, but weight must be kept well aft or the bow wave starts bouncing off the floats and entering the cockpit through a gap below the wings.

In light airs '*Trim*' ghosts along very well.



Trim, Andre Kanssen.

What do I want to do this winter? First, the gap below the wings must be filled. Then, I want to experiment with the angle of the floats, and also increase the amount of toe-in to try and get more dynamic lift. I also want to add a small foresail as she certainly could carry more sail. Then I can start thinking about my 25 ft. cruiser . . .

TRIMARAN "*TRIPLE SEC*"

BY

PAUL ASHFORD

Holly Lodge, Strumpshaw, Norwich, NOR 77Z.

L.O.A. 14 ft. 0 in.
Float length 8 ft. 0 in.
Overall beam 8 ft. 0 in.
Sail Area 120 square feet.

Design displacement 500 lb.
Float displacement 180 lb.
Overall weight about 200 lb.

"*Triple Sec*" represents a first venture in trimaran design, and may I hope become a working model for the development of a larger cabin craft. The design aim was a craft small and light enough for car top transport and beach launching, able to give a lively performance

Triple Sec, Paul Ashford.

with a crew of one or two and yet have enough buoyance to carry a crew of three, or two adults and two children.

Edmond Bruce's article on Running Resistance of Multihulls in Publication No. 45 I found of immense interest, and this suggested a convenient way of drafting the lines of the central hull. The first stage was to draw on cartridge paper a set of semi-circular sections representing the underwater body of an appropriate reference hull.

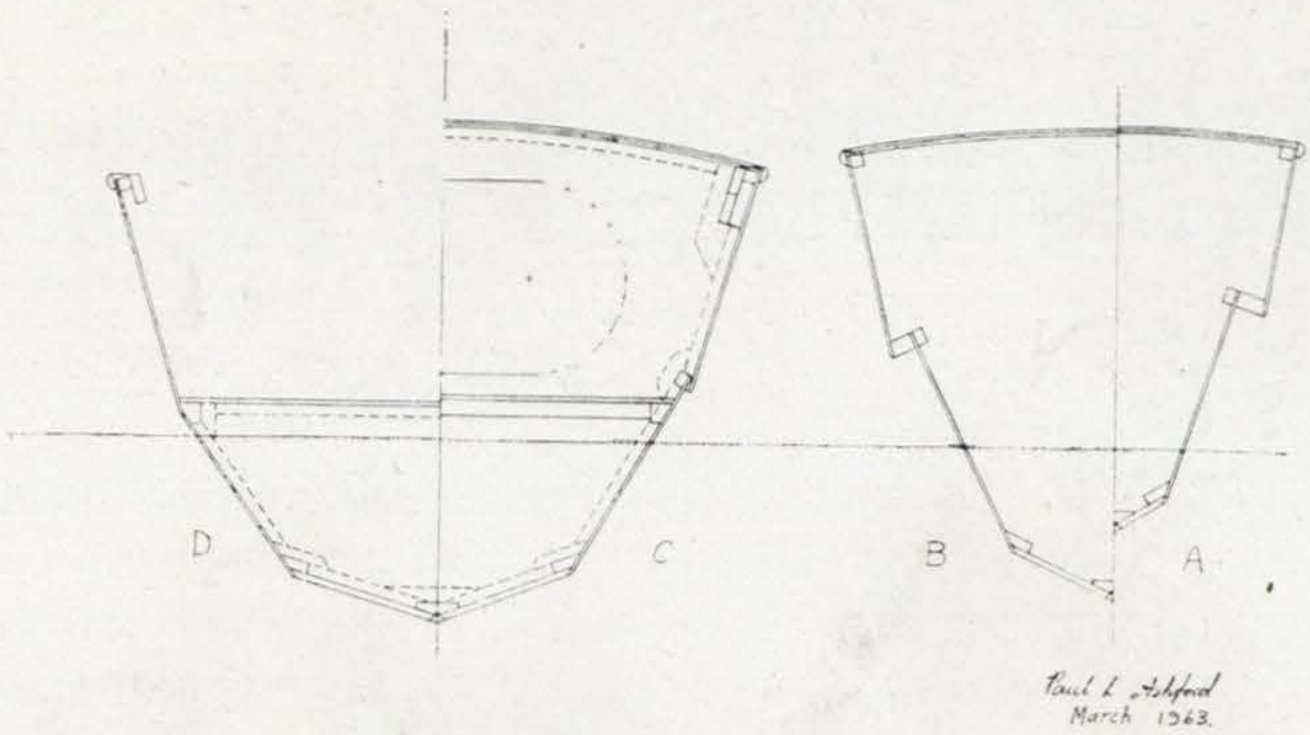


Fig. 1. *Triple Sec, Sections.*

The actual hull sections and lines were then drawn on a sheet of Permatrace directly over the reference sections, introducing the chine form with the minimum of deviation from the semicircular sections forward and a gradual flattening amidships and aft to give manoeuverability and the buoyancy needed for family sailing. The submerged

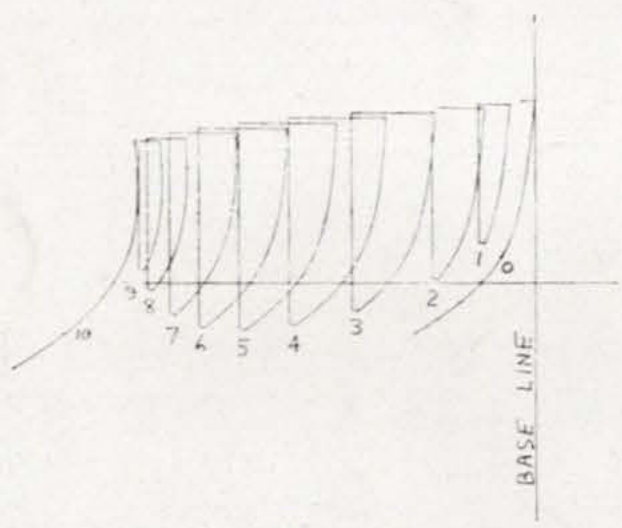


Fig. 2. *Float Sections, Triple Sec.*

area of each section was made equal to that of the corresponding reference section by eye. I found this idealised set of lines a most helpful guide to drafting the final lines with the required distribution of displacement; it also gives an immediate visual impression of the extent to which the wetted surface is being increased above the absolute

minimum by concessions to ease of construction or following one's hunches on hull form.

The reference hull form was proportioned to have 500 lb. displacement, with a semicircular midships section of 1 ft 7 in. diameter on a length of 14 ft. 9 in.; this gave L/B = 9.35, falling between Edmond Bruce's models 8 and 12, which seemed to promise well for all-round performance. The actual water line length is a foot shorter, the natural termination of the lines being truncated at the transom.

The outside face of each float resembles part of a horizontal cylinder, while the inside face is vertical but curves in plan, the general idea being to produce some degree of both windward and stabilising lift.

The bottom planks of the centre hull are of 8 m.m. ply to resist beaching, the next strakes of 5 m.m. ply, and the top strakes and floats are of 4 m.m. ply, all on Parana pine stringers. The cockpit sole is of 6 m.m. ply, just above the water line, and drains through flapped holes in the transom.

The sail is a semi-elliptical balanced lugsail with seven battens, and a good idea of the sailplan is given by the bottom right-hand photograph on page 6 of Publication No. 50. The centre left photograph on the same page shows the hull and floats being assembled,

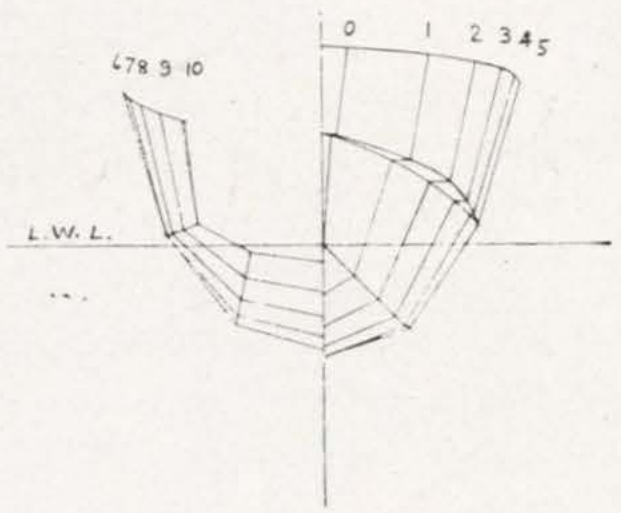


Fig. 3. Float Sections.

before fitting the terylene canvas seats between the central hull and the floats. I had this sail made with the intention of setting it on a rotating mast in the way I proposed on page 60 of Publication No. 45, but when I came to design the mast it became apparent that the loading in the heel and deck bearings would be considerable, whereas due to the balanced sail plan the turning force into wind would be relatively tiny, and that without rather elaborate low friction mast bearings it would probably be impossible to spill the wind. As I wanted to sail the tri on my annual holiday, and building time was fast running out, I settled for a simple cantilever pole mast. Each

batten is laced to this, and the sail is sheeted by a multiple sheet to the lower three or four battens. The mast takes apart at a central fishing rod type joint for transport. As the overall length of 25 ft. 0 in. looked rather alarming and I had some doubts about the joint, the first top section was a temporary affair of half length, enough to set 5 of the 7 panels of sail, giving an area of about 75 sq. feet.

This just left time for a quick coat of grain sealer all round before setting off on holiday, and a few days later "*Triple Sec*" was launched with due ceremony from the beach of Grand Havre, a delightful nearly landlocked bay on the west coast of Guernsey, where we were able to mix sailing with all the usual beach activities.

Although the trials that followed took place with an uncompleted and reduced rig, they were most enjoyable, and several interesting points emerged. The performance off the wind came well up to expectations, but I felt that the course made good to windward was somewhat disappointing. I suspect that this was due in part to the fact that at this stage the sail, with $\frac{3}{4}$ in. dowel battens, was setting quite flat, and possibly in part to lack of a centreboard. Certainly the angle of leeway was more than I have been used to in a keel or centreboard boat.

In spite of having neither a fin to turn on or a foresail to back, putting about seemed reasonably certain once the right technique was learned. This seemed to be to get the windward float down into the water by sitting out and letting go the sheet to spill the wind, so that the tri turned about the immersed float, and to stay on this float until the sail began to fill on the new tack.

Initially the mast was placed at about 25 per cent chord, i.e. quarter way back along each batten from the luff. This was too far into the sail for it to "weathercock", and even when the sheet was slack the sail continued driving quite hard. This difficulty disappeared when the batten lacings were adjusted to bring the mast nearer the luff, at about 15 per cent. chord. It nearly led to shipwreck at the start of the second day's sailing when it blew very hard, and I pushed out solo with only the top four panels, about 50 square feet, of sail set. At this stage I had no tiller extension and was unable to stay out to windward while putting the helm down to go about, and when she had come part way up into the wind, the aft end of the nearly awash lee float seemed to take hold and put her back on the same tack.

After three fruitless attempts to put about some jagged rocks ahead convinced me that it was time to bear away and "*Triple Sec*" shot away like a scalded cat to test the gybing qualities of the rig.

This proved excellent, as the unstayed mast allowed the sail to be squared off, so that when the gybe came, the sail weathercocked right into wind and the force of the gybe was checked by the wind itself and not the sheet.

On return home I set about making a full length top section to the mast and this was completed just in time for the Weir Wood meeting, (a most enjoyable affair for which I would like to thank Fred Benyon Tinker and his helpers.) The $\frac{3}{4}$ in. dowel battens were replaced by $1\frac{1}{2}$ in. x $\frac{3}{8}$ in. battens with a string stretched along the batten on each side of the sail. The strings on each side were connected together near their centres by a downhaul line, and by pulling down on one of these some flow could be induced in the sail.

The first difficulty encountered was to get all the battens bending evenly, which was probably largely due to the stretch in the $\frac{1}{2}$ in. plaited terylene strings used; wire would no doubt be better, although more difficult to fix. Another more basic difficulty which appeared was a tendency for the lower batten bending string to take over the functions of a kicking strap, so that lifting of the clew of the sail bent this batten much more than the others, and I believe that it was largely due to this effect that the bottom batten finally broke in almost a flat calm on the second day of the meeting ! At present the only way I can see of getting round this is to add a stiff boom and kicking strap.

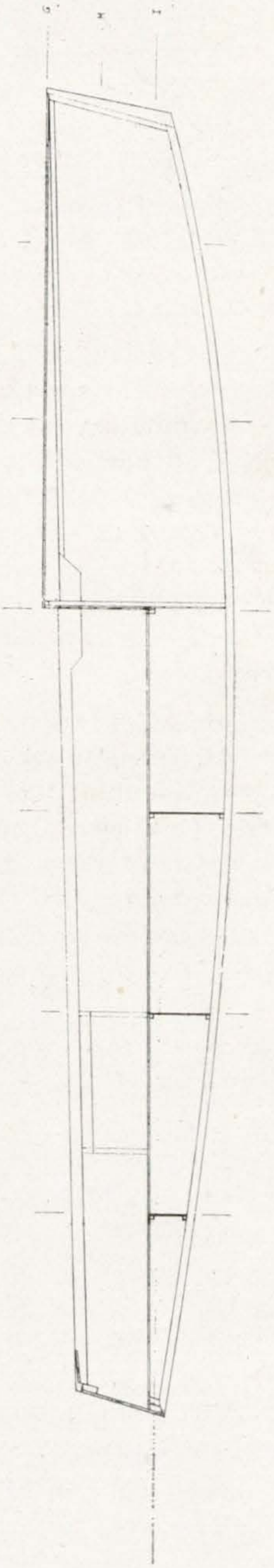


Fig. 4. *Triple Sec Hull Profile.*

Performance generally was improved under the full rig, but a good deal more twist appeared in the sail in spite of multiple sheeting to the bottom five battens. There was also a tendency for the upper parts of the sheet to get caught behind the projecting end of the lower battens. Both these faults seemed to stem from the sheeting point being too nearly under the clew of the sail to provide an effective direction of sheeting to the upper battens, but it would almost seem desirable with multiple sheeting to try to avoid any projection of the battens beyond the sail leach.

I am at present putting in a centreboard and am looking forward to more sailing, both under experimental rig and a normal bermudan sloop rig. I am also hoping to try out some of the foil stabilising ideas which have been described in A.Y.R.S. publications, as I feel sure that these will prove valuable.

SEA WRAITH

Designer, Builder and Owner: D. S. BANHAM & SON, Highlands, Blackstones, Redhill, Surrey.

2/3 berth Trimaran, Cabin Cruiser.

Length, Main Hull 18 ft.
Length, Outriggers 13 ft. 6 ins.
Beam, Main hull 3 ft.
Beam, Outriggers, 1 ft.
Maximum overall width, 12 ft.
Towing width, 7 ft.
Total weight, approx. 750 lbs.
Draught centreboat up, 1 ft.
Draught centreboard, down, 3 ft.
Sail area, Main, 155 sq. ft.
Sail area (if required) jib, 70 sq. ft.
Total Cost (at launching) £54 11s. 0d. (including main sail).

The object was to build a "small ship" capable of being towed behind a car, to weigh approximately 600 lbs. and not more than 900 lbs. At the same time, it must have a "big ship" stability, ease of control; must be safe to cruise in shallow coastal waters; must be able to run up on to a beach (thus eliminating the need for carrying a dinghy) and remain upright when aground; have a 2/3 berth cabin and be non-capsizable.

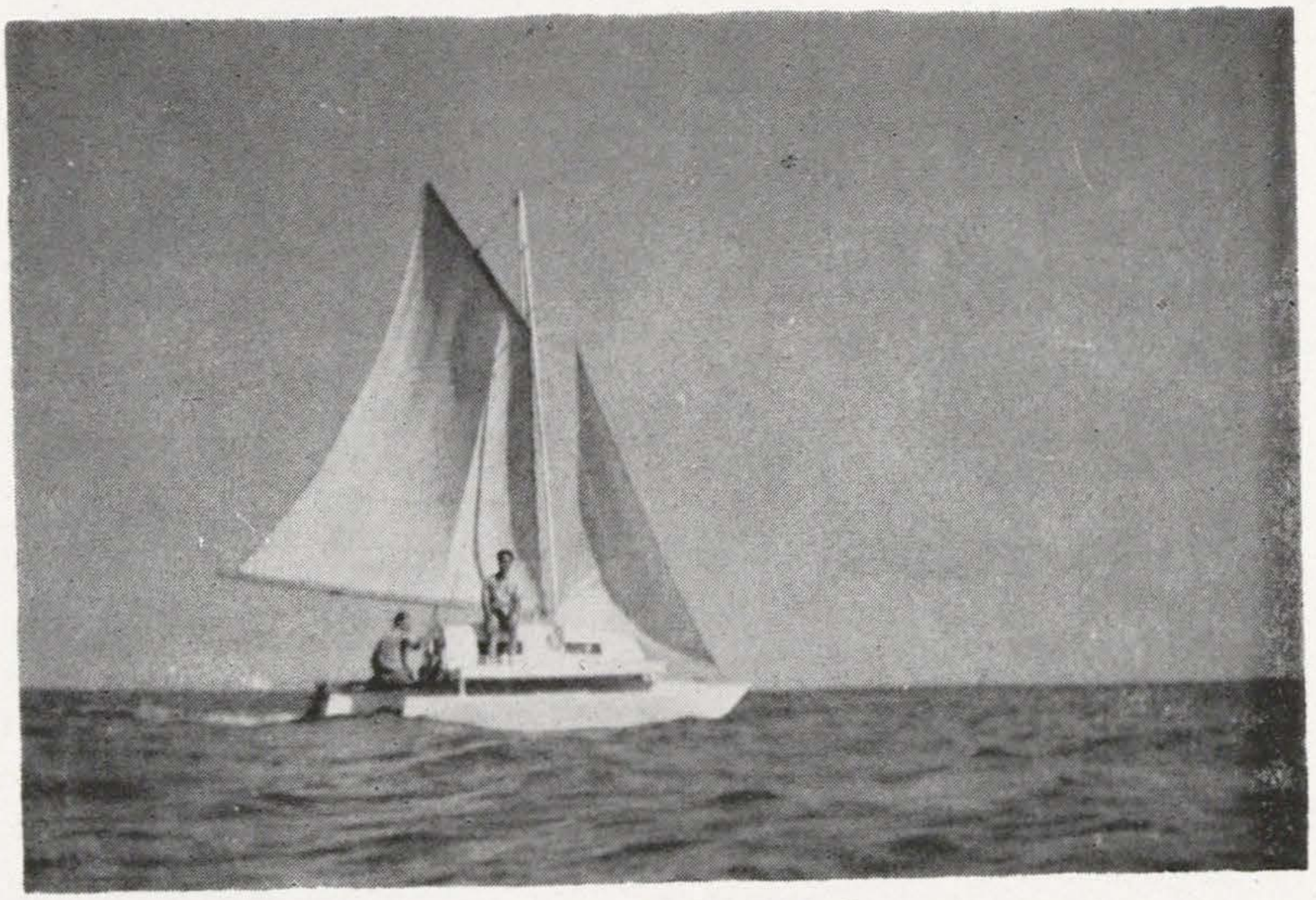
Many of these requirements precluded the mono-hulled craft and the design would, therefore, have to be a multi-hulled one. A non-capsizable craft meant that a catamaran was also out of the question leaving the trimaran the final choice.

The question of towing behind a car then arose, because of the excessive width of the trimaran configuration in relation to its length. It was decided to build a craft 18 ft. long and this would mean having an overall width of 12 ft. The length of the boat was decided by the

distance from our workbench to the garage door and the fact that a cruising vessel with a cabin would mean a minimum length of 18 ft.

The problem of the 12 ft. overall width being too wide for towing was overcome by bringing the outrigger crossbeams just outside the cabin walls and folding the outriggers up on to the cabin sides for travelling, leaving a maximum total towing width of 7 ft.

Hinges were not used but two alloy plates 2 ft. long by 4 ins. wide by $\frac{1}{4}$ in. thick secured with four coach bolts 5 in. long by $\frac{5}{8}$ in. thick at each junction. This type of connection was used as the plates were relatively easy to obtain and cheap compared to massive stainless steel hinges which would have had to be specially made and would have been heavy and extremely dear in consequence. Using hinges would also have meant extra width (at least 6 in. each side) outside the cabin walls. The plates, on the other hand, were made to slide easily on each side of the main cross beams and do not alter the width of the main hull.



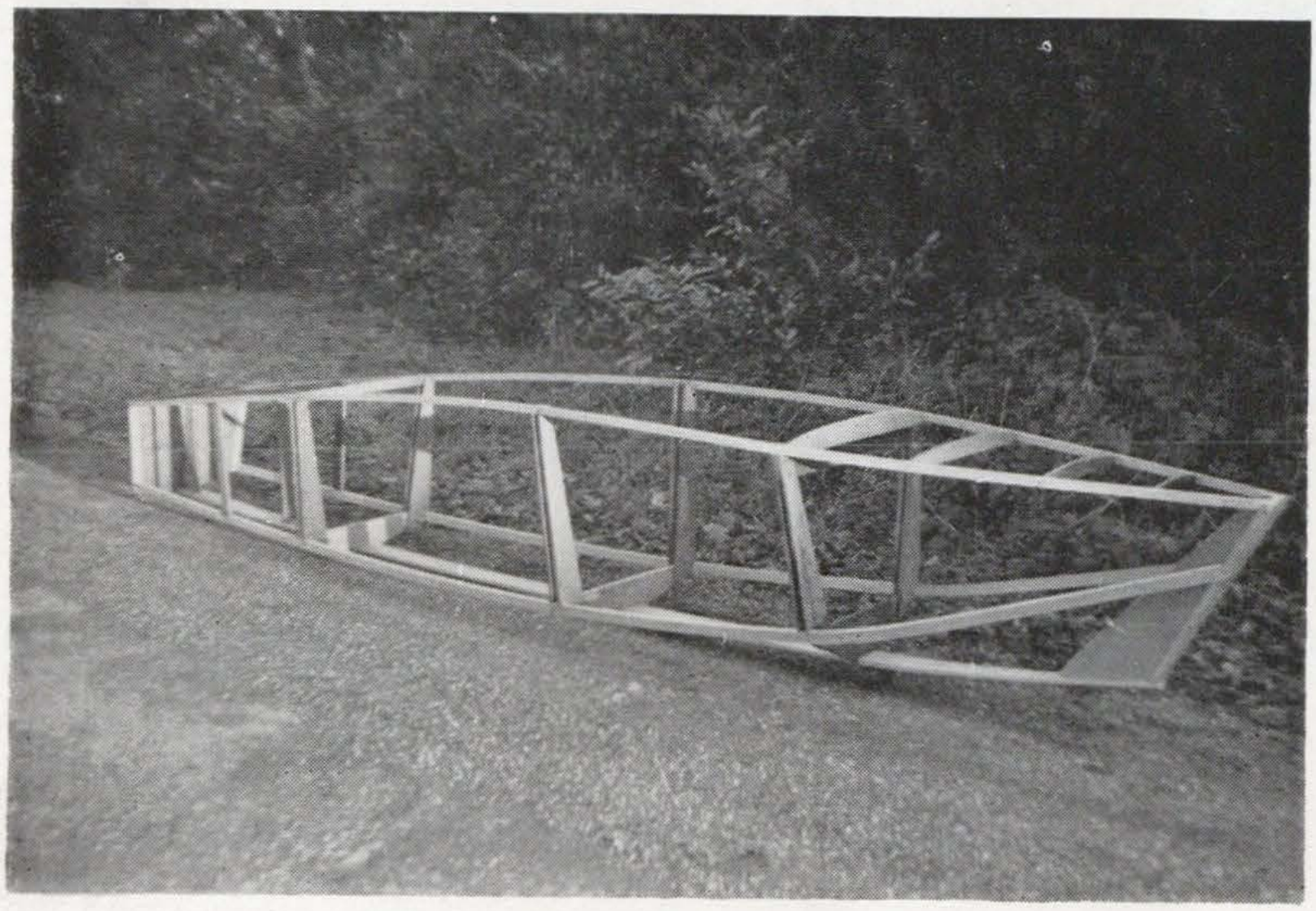
Sea Wraith, Dennis Banham.

To take the weight off the cabin roof, and thus dispense with the need for a "king post" in the centre of the cabin, it was decided to use a bipod mast and sling the 155 sq. ft. mainsail between the uprights. As an alternative rig, the mainsail could be moved aft with the luff wire in line with the mast and a jib of approximately 70 sq. ft. giving additional sail area.

The main hull of hard chine construction skinned with $\frac{1}{4}$ in.

mahogany marine ply. The gunnels and chine are 2 in. x 1 in. and the hog of 4 in. x 1 in. Parana pine. The three sets of ribs and the transom are of $\frac{1}{2}$ in. mahogany while the stem, rudderhead, tiller and cabin beams are of 1 in. Oak; the rudder blade is of 1 in. mahogany and the centre board case is of 1 in. Pine. The mahogany, oak and pine were obtained from an old billiard table, some oak shelving and an old tabletop. The centreboard itself is of sycamore 5 ft. long by 1 ft. wide by 1 in. thick.

The main crossbeams to the outriggers are of box construction 4 in. x 4 in. by $\frac{1}{2}$ in. Parana pine, with 2 in. x 2 in. deal blocks inside, where the structures and hinges join. The bipod mast, which is supported by two side stays and a forestay, was made from two aluminium scaffold poles, each 21 ft. long, 2 in. diameter and $\frac{1}{4}$ in. thick. The bottom of each pole is fixed by a steel bolt to a mild steel strap running across the entire width of the cabin roof, thus spreading the load and also allowing the mast structure to be lowered on a pivot ready for towing.



Sea Wraith—Main Hull Skeleton.

The two bunks, each 6 ft. long by 18 in. wide, are outboard of the main hull, the latter being 3 ft. wide at the gunnels. Space for a third bunk is situated forward of the centre rib and into the forepeak. The cabin 7 ft. 6in ins. long allows for cupboard space at the end of each bunk and across the front end of the cabin. Additional storage space

is in the forepeak and also in the cockpit cupboards plus, of course, the outrigger hulls which have a hatchway in the centre of each deck. The fore and aft parts of each outrigger hull are filled with water tight plastic buoyancy bottles leaving 7 ft. 6 ins. at the centre free for stowage of gear. Each outrigger is 13 ft. 6 ins. long by 1 ft. wide at the gunnels. The hogs and the gunnels are of 2 in. x 1 in. Parana pine.

Sea Wraith.

Each outrigger hull is skinned with 4 m.m. Mahogany marine ply and, like the main hull, has three bulkheads each of 1 in. mahogany.

The connectors between the outrigger hulls and the main crossbeams are of 2 in. x 2 in. solid deal. Each one is fixed to the outrigger hog, glued and screwed to the bulkhead and carried right through the main crossbeams. Two mild steel 7 in. angle brackets reinforce each strut.

Cabin walls and roof are of 4 m.m. mahogany marine ply with internal crossbeams of 4 in. x $\frac{1}{2}$ in. oak.

The gaff mainsail in excellent condition is made of heavy Egyptian cotton and was purchased secondhand from a well-known sail making firm for £6. "*Sea Wraith*" was launched on Easter Sunday 1964 at Weirwood Reservoir, East Grinstead. The boat was extensively tested over the weekend. In moderate winds of force 3 to 4, she handled very easily and "came about" without any difficulty, although there was a fair amount of weather helm when using only the mainsail. Using a borrowed Jib, the craft sailed extremely well, with only the

slightest weather helm pointing high and proving a fast stable vessel. Launching from a road trailer proved very easy, the vessel floating off in approximately 18 ins. of water. The time taken for recovery, stowing mast and sails, hooking up ready for towing was approximately 45 minutes. No doubt this time will be considerably shortened with practice.

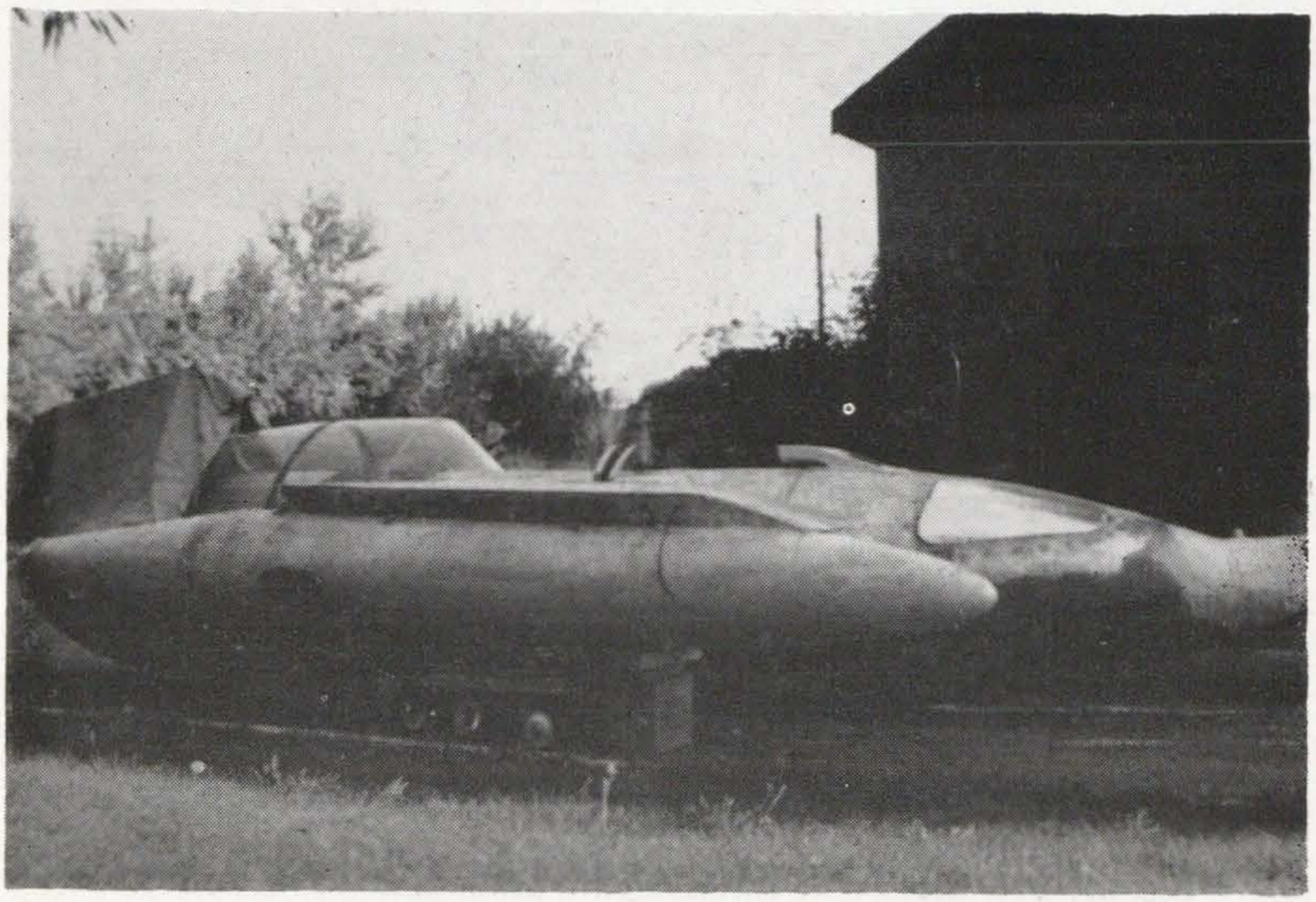
Although using only tools found in the average man's garage, "*Sea Wraith*" (commenced 1st October 1962 and launched 28th April, 1964) would have been finished much sooner but was delayed due to the illness of the builder.

It is hoped to sail her at Brixham and Poole this year.

"*TRY ONE*"
OR
"A TRANS CONTINENTAL TRIMARAN"

BY
G. F. KRONEBERGER
61 Montego Key, Bell Marin Keyes, via Novato, Calif.

The above play on Piver's title results from the fact that this trimaran has travelled 800 miles since construction was started and still has not lain upon the waters. The main hull was trailered on its own retractable wheels. The outriggers were shipped separately



A Drop Tank Trimaran, Kroneberger.

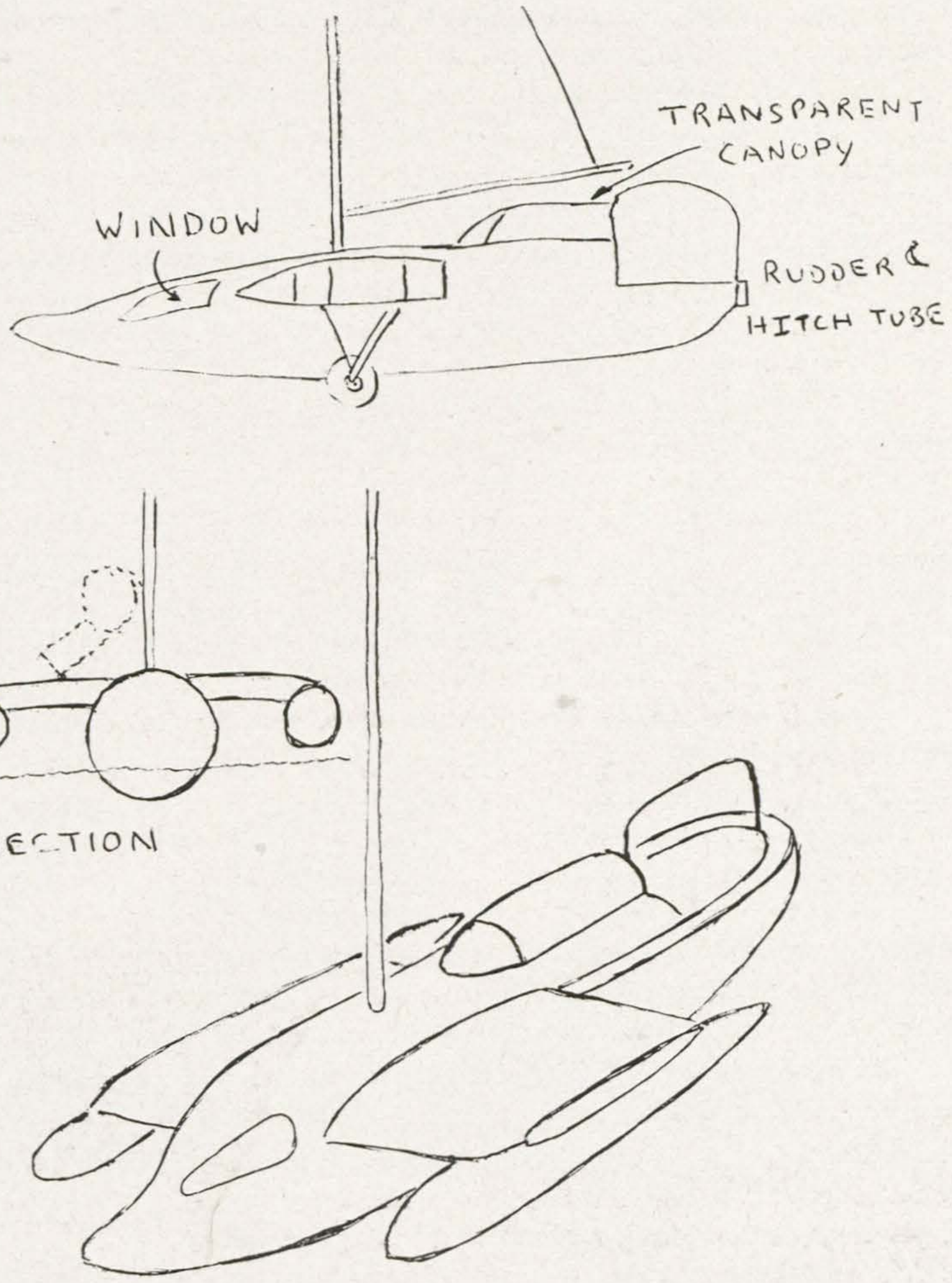


Fig. 1. *G. F. Kroneberger's drop tank trimaran.*

because of the length of the trip and the fact that it was winter and several mountain passes had to be crossed.

The Main Hull. This is a high strength aluminium aircraft drop tank 4 feet in diameter and 24 feet long. It is thus all cabin or cockpit except for the small portion of the X frame which attaches the floats. It is used "Backwards" i.e., with the "tail" end as the bow for a cleaner entry, reduced windage and greater cockpit room. It is fibreglass covered for resistance to corrosion, abrasions and dents.

A Plexiglas window is let in at the bow and a canopy of similar material covers the pockpit and cabin aft.

The Floats. These are also aircraft drop tanks but 18 feet long and 20 inches in diameter also fibreglassed but used with the blunter end forwards.

The Outrigger Arms and Wing Deck. The strength here is in X shaped box girders for lightness, strength, rigidity and minimum cabin interference. The beams are covered with plywood panels for wing shape. The outriggers hinge in for 7 ft. 6 ins. trailering width and 13 feet of floating width.

The Rudder Post. This is a tube which accepts the rudder for sailing, the hitch post for trailing and the third wheel post for ground handling during storage on land.

The Mast. This is of foam filled light alloy, the foam giving stiffness and buoyance. It will rotate to reef the Mylar (Melinex) sail.

The Retractable Wheels. The hull has retractable trailering gear weighing 60 lbs. The suspension is easily built, adjustable and it proved itself by hauling the 1300 lb. main hull the full distance of 800 miles with tyre wear the only trouble. High capacity aircraft wheels are used and the 12 inch tyres just do not have enough rubber for cross country trips. Part of this may be due to having used aged surplus tyres from Los Angeles. One actually blew out at 55 miles an hour (this speed is not recommended) and except for the loud report, I wouldn't have thought that anything was wrong. The boat trailed beautifully except for a little concern during 35 mile gusts from a side wind on the trip across the salt flats in Utah.

G. F. Kroneberger's design needs are interesting. He states his requirements as follows : He wants a sail boat which

1. is safe.
2. has room for a small family, inside and out.
3. is trailerable.
4. has shallow water capabilities.
5. has ease of operation, maintenance and construction.
6. has good performance.
7. is of low cost.

Surely, he has achieved these things very well in his trimaran.

"*TREBLE*" 27 FT. TRIMARAN

Designer : ROBERT HARRELSON, Corpus Christi, Texas.

General Description

L.O.A. 27 ft.
Beam, 16 ft.
Draught (Bd. up) 21 ins.
Sail Area, 272 sq. ft.

Purpose. This boat was designed for a man to sail across the Atlantic—alone. She has now been adapted as a comfortable cruiser

for three and may be arranged to sleep as many as six, yet all the features that made her an ideal single hander have been retained. All sheets and halyards are run to the well protected central cockpit, which is self bailing. The modest area of the ketch rig makes for

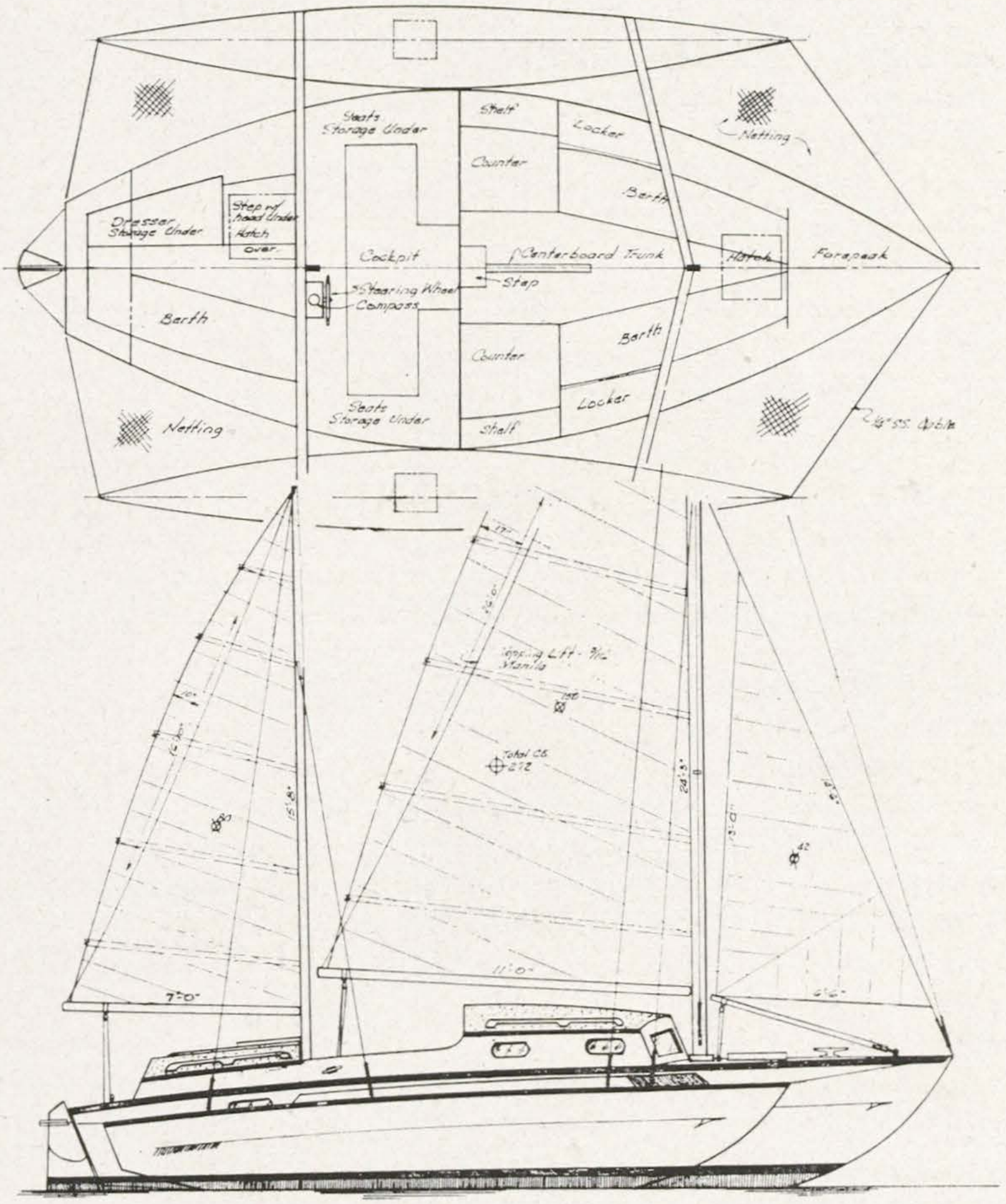


Fig. 1. *Treble, Robert Harrelson.*

easy sail changing while still offering amazing power for relatively great speeds, and the sheets have been arranged so that all working sails are self tending. Her wide side decks and netting between the hulls provide unheard of safety and comfort on a boat of this size.

Hull Shape. The main hull is actually triangular in section evolving easily into a normal vee bottom at the stern. The shape of the floats is also vee.

Headroom. Full headroom in the main cabin and generous sitting headroom in the after cabin.

Storage Space. The little boat has a tremendous amount of space for storage. Many lockers, shelves, the large forepeak, space under the cockpit, and the entire volume of both floats are all available and easily accessible.

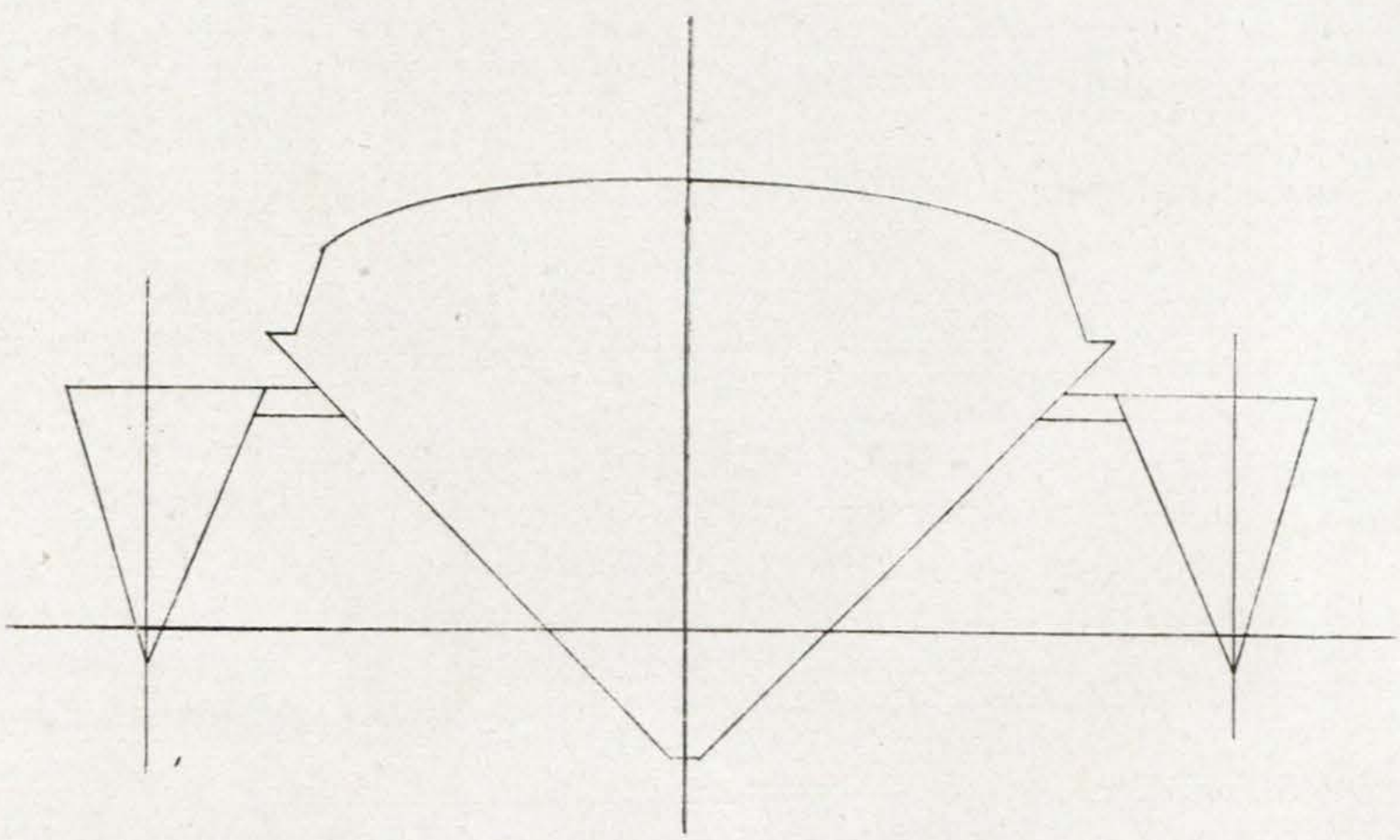


Fig. 2. Treble Hull Section.

Materials. She is inexpensively built with fir or pine framing, planked and decked with fibreglass covered fir plywood. The spars are easily made up from fir or spruce planks and plywood, while rigging is stainless steel and nylon. All lumber has been kept to stock lumber yard sizes.

Labour. The boat can be built by the average amateur in about 450 to 500 hours.

Building Cost. $1200 to $1500 less sails.

Ease of Building. Treble has been designed with the amateur builder in mind. There are no sharp bends and no steaming is necessary. This design incorporates no tricks or gimmicks but her construction has been simplified, without sacrificing strength, to a point where she is a relatively easy boat to build.

Plans. Complete plans are available at a cost of $85 per set.

"*VOLANT*" TRIMARAN

Length Main Hull, 34 ft. 6 ins.
Beam Main Hull, 9 ft.
Length Floats, 28 ft.
Beam Overall, 20 ft.
Displacement, 2 tons 18 cwt.
Draught, 30 in., C/board down 6 ft.

Sails, Mainsail 325 sq. ft.
Sails, Large Jib 320 sq. ft.
Sails, Cruising Jib, 212 sq. ft.
Sails, Storm Jib 140 sq. ft.
Sails, Genoa 475 sq. ft.
Sails, Spinnaker, 650 sq. ft.

Designer, Owner and Builder: K. M. McLEAN, 68 Vincent Street, Auckland C.I., New Zealand.

This design was adopted after some testing with models, and many minor alterations were made over a period of about 12 months—being finally drawn in 1961. The construction took about 21 months of single handed effort by the owner and she was launched in November 1963.

The reasons for the choice of the spade shaped sections of the main hull rather than semi-circular which no doubt would give greater ultimate speed were firstly, that as it was to be a family cruising boat the motion would tend to be less lively. Secondly as appearance was being sought, by keeping the rise of floor steeper the floorline would be lower in relation to the waterline, therefore the topsides and cabin-top could be lower and still maintain full headroom, which was an essential. Finally with more hull below the water and less above, windage is reduced and windward performance can be expected to gain.

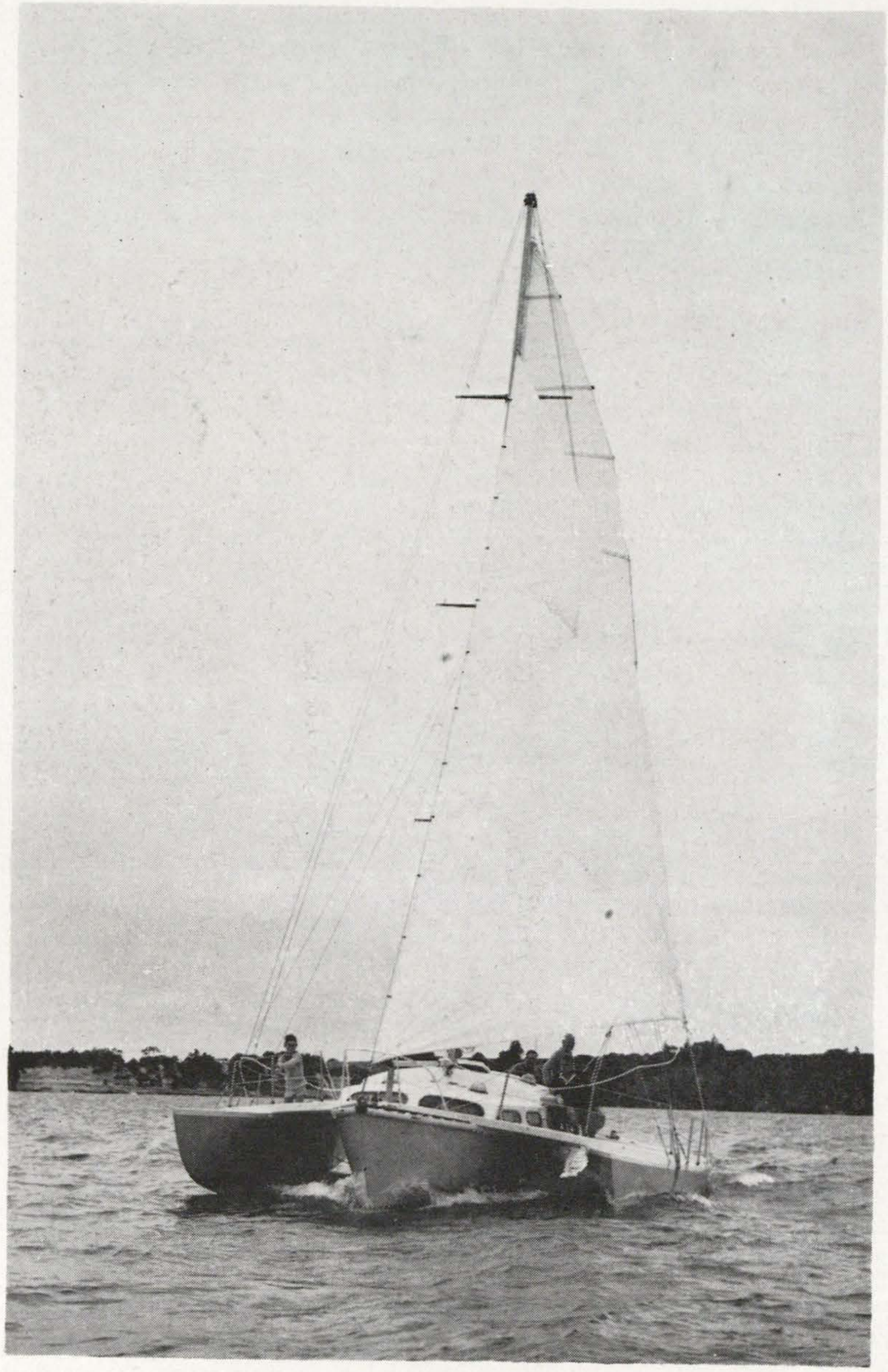
The cabin sides do not extend outside the main hull as in Piver trimarans, making the construction simpler and again reducing windage and enhancing appearance. The same number of berths is available simply by using the backs of the settee berths as upper bunks through their being hinged. This makes for very comfortable seating around the table and gives a cosy effect when the berths are not in service for sleeping.

A folding bunk forward of the main bulkhead and opposite a spacious washroom, toilet and hanging locker is an excellent berth which is particularly useful for stowing bedding and sundry gear when the side is folded up.

The forepeak has another spacious bunk under which is a large water tank which serves the washroom.

The galley and seats in the main cabin can be seen in the photograph of the interior before the backs of the settees were fitted. Sails are stowed in the stern under the floor of the self-draining cockpit.

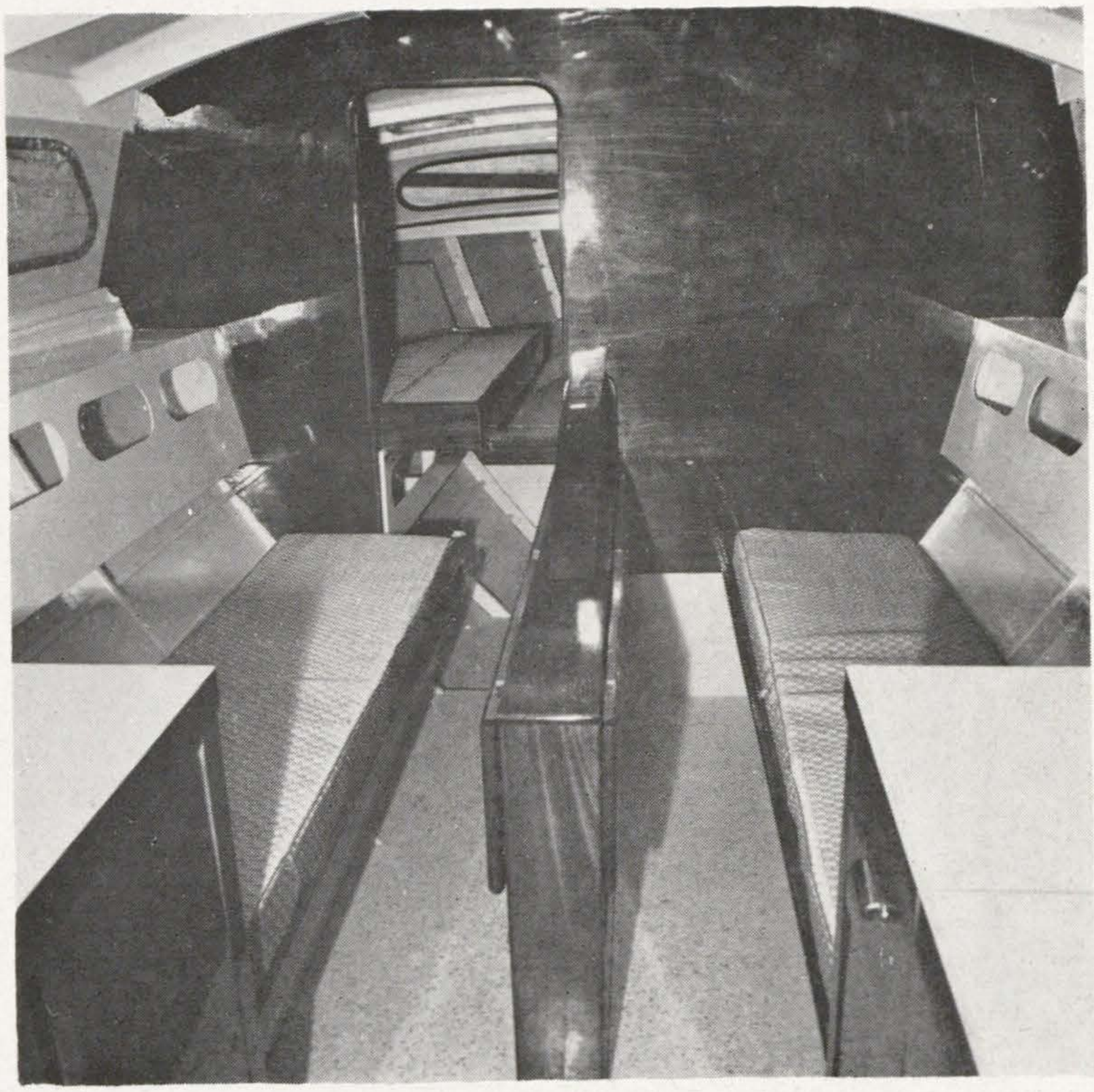
The construction of the main hull is with 12 stringers each side over 12 frames, over which is diagonally laid 2 skins of 3/16 in. Makore



Volant, K. M. McLean.

Mahogany Plywood. The lines are so straight that it was possible to lay the inner skin with 24 in. wide strips, while the outer skin laid the opposite way was 12 in. wide strips. An epoxy resin fibreglass skin was finally applied.

The floats are built over ten frames with seven stringers each side. The shape is asymmetric with a chine on the outside and straight V on the inside. This gives a bottom of 85 deg. up to the chine with



Volant—Looking Forward.

about 50 deg. angle above the chine and serves the double purpose of reducing friction when coming about and reducing wetted surface in light airs. The quicker manoeuverability was the prime reason for the choice of this shape and it is interesting to see that Dick Newick has used a similar shape in his designs.

There are no crossbeams obstructing passage through the inside, as the forward crossarms which are laminated to 10 in. x 4 in. angle

forward from directly opposite the mast at 45 deg. to meet on the foredeck ahead of the cabintop. A $\frac{5}{8}$ in. diameter Stainless steel rod picks up the chainplate on the outside of the float, goes diagonally downwards through the float and is anchored to a very substantial fitting on the main hull about 9 in. above the waterline. These hull fittings are built over the main bulk-head, which also takes the heel of the mast over the main cabinroof.

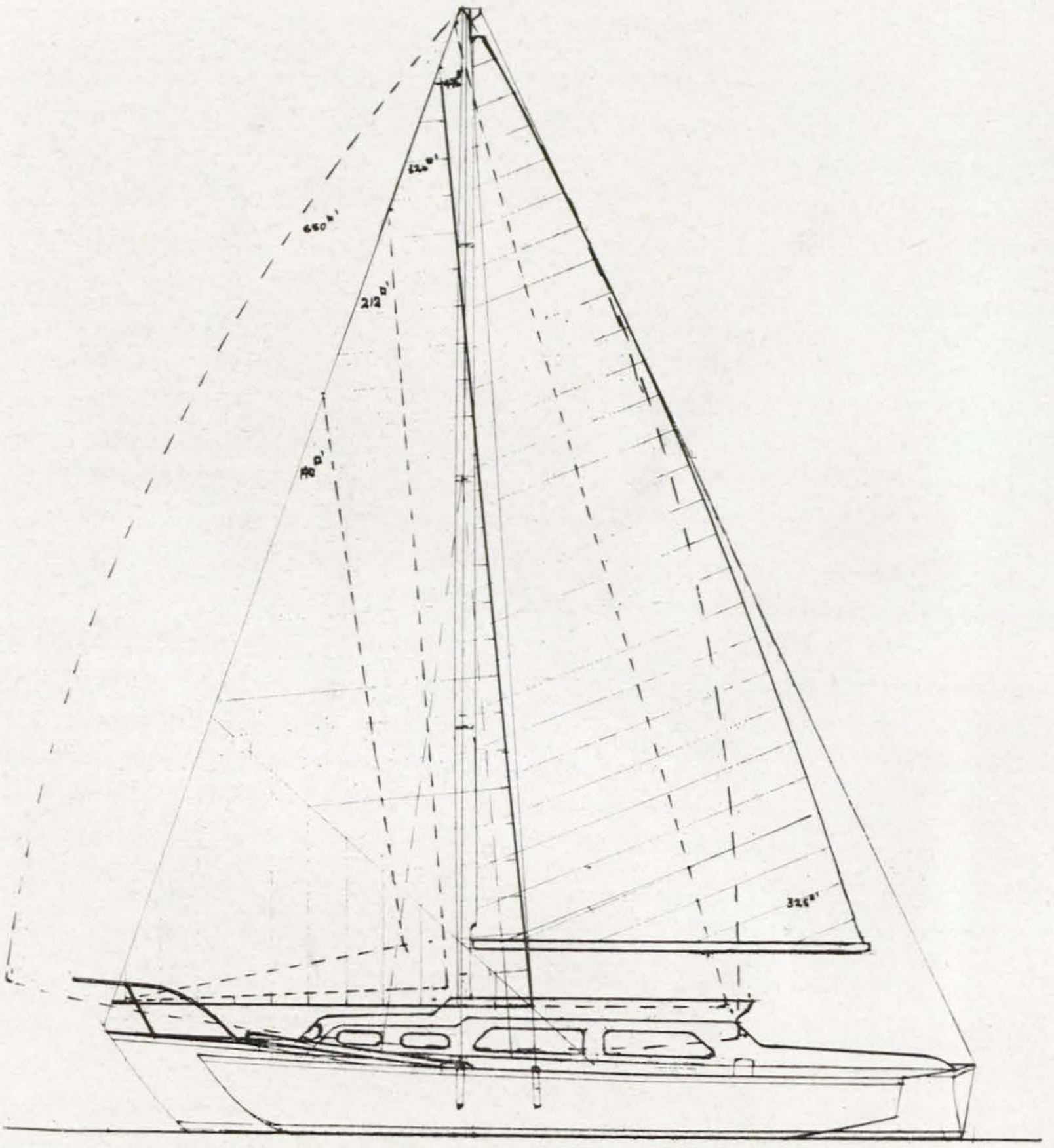


Fig. 1. *Volant Sail Plan.*

The after crossbeams are set square across the after side of the aft bulkhead, and these too are broken by a substantial U girder construction to which they are bolted to give easier entry to the main cabin.

This system of tying the three hulls together has the advantage

of rigid bracing directly opposite the mast, but allows flexibility through the laminated crossbeams for the floats to pivot slightly fore and aft of the stainless rod and thus reduce shock loadings. It is also simple to maintain as any fault that could occur is quickly seen and readily made good. Underwater a built-up centreplate of streamlined section 3 in. thick at its greatest point is shaped in profile as a quarter segment of a circle and is 4 ft. 6 ins. long pivoting at a 4 ft. radius giving a maximum draught of 6 ft. when fully dropped.

The rudder is hung on a skeg 2 ft. 6 in. deep also streamlined into the rudder at 3 in. thick at its greatest chord and with one third of the total area in the skeg and the remaining two-thirds in the rudder. This has proven most efficient as the lift effect of the turned rudder forming a wing section offsets the lateral drag of the skeg, with the result that the ship goes about easily and steering in a following sea is child's play.

The performance to date is everything that was expected by the designer, and although no fantastic speeds have been recorded to date we have fairly readily shown our stern to all types of trimarans here—and there are very many. We record 10 m.p.h. going to windward quite readily and generally make good nearer to the wind than any other multi-hull we have so far encountered. Our best speed of 15 m.p.h. with Genoa Jib was in quite moderate weather so we have yet to experience a real speed test.

However the designer makes no claim of exceptional top speeds but is satisfied that in average conditions (10 to 20 knot winds) that the all round performance is better than any other Trimaran so far experienced. Coupled with this is an exceptionally easy ride—rather less lively than the very light designs—excellent windward performance and no vices whatsoever in handling. The auxiliary power is a 10 horsepower Johnston outboard which has taken us 28 nautical miles in 4 hours at $\frac{3}{4}$ throttle.

11 METER TRIMARAN

BY

ERNST U. WINTELER

L.O.A., 11.00 m., 35 ft. 11 ins. Sail area, 500-700 sq. ft.
Extreme beam, 6.60 m., 21 ft. 8 ins.
Hull draught, 0.75 m., 2 ft. 6 ins.
Float Draught, 0.30 m., 1 ft. 0 ins.

Designer : ERNST U. WINTELER.

This is a fine big trimaran with lots of accommodation for its size. It is intended to build her of a sandwich of foam and fibreglass

— SAIL LIST —

SAIL	WEIGHT	MATER'L	AREA
MAINSAIL	10,5 oz	DACRON	25 sq.mtr
STAYSAIL	9 oz	"	9,5 "
No. 1 JIB TOPSAIL	5,5 oz	"	22 "
No. 2 JIB TOPSAIL	9 oz	"	17 "
STORM TRYSAIL	10,5 oz	"	8,5 "

GENERAL NOTES

1. WEIGHT OF MATERIAL IS Ounces PER YARD, US STD WIDTH 28,5"
2. AREA OF ROACH IS NOT INCLUDED IN MEASUREMENTS
3. MAINSAIL AND STAYSAIL ARE FULLY BATTENED
4. JIB TOPSAILS ON LUFF SPARS

SAIL PLAN
11 MTR TRIMARAN
FOR
ERNST-U. WINTELER
(SHEET 1 OF 4 SHT.)

PRINCIPAL DATA

	MTR	FT.	IN.
LENGTH OVERALL	11,00	35	11
EXTREME BEAM	6,60	21	8
DRAFT OF HULL	0,75	2	6
DRAFT OF FLOATS	0,30	1	0

SCALE: 1:50

1 0 1 2 3 4 5 6 7 8 9 FT

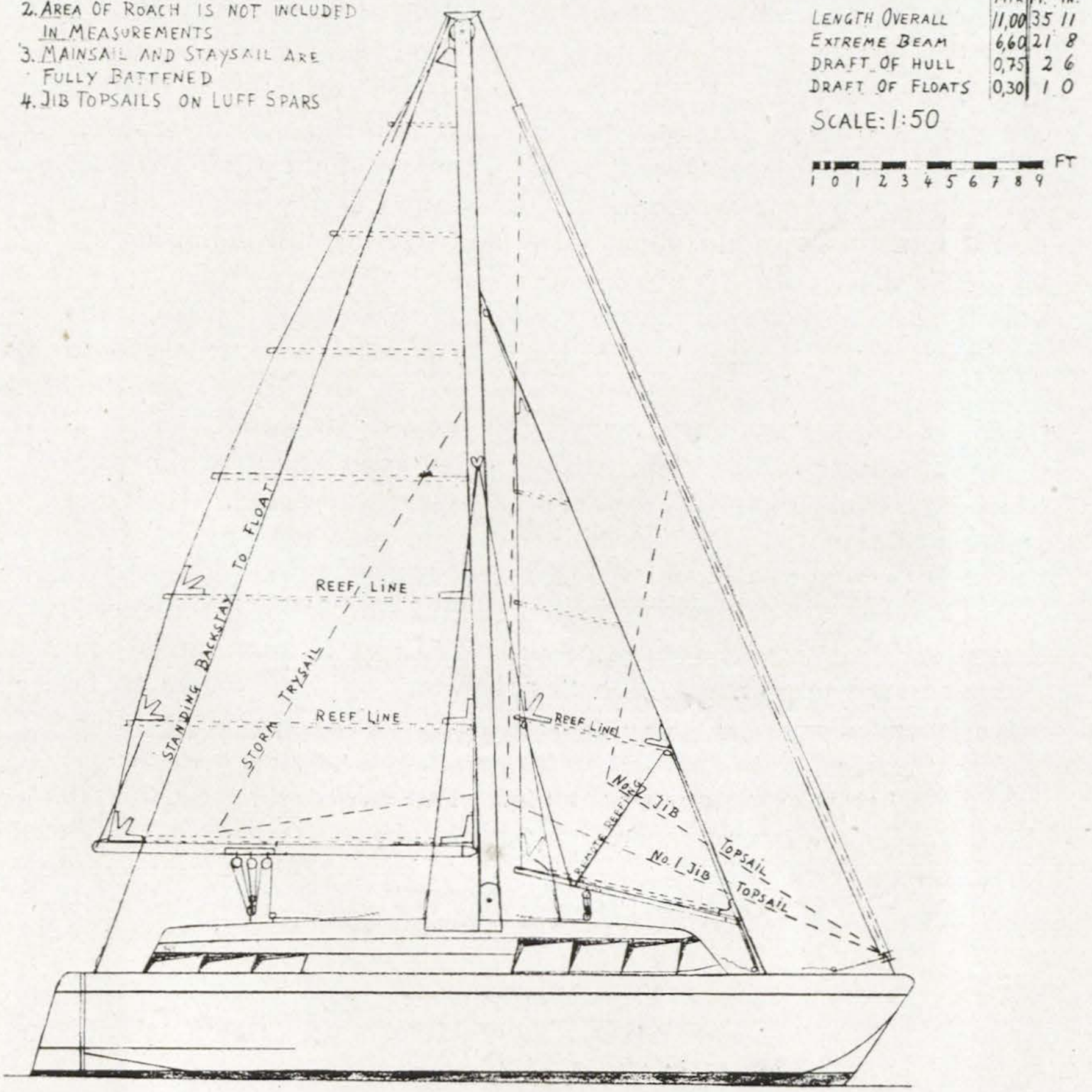
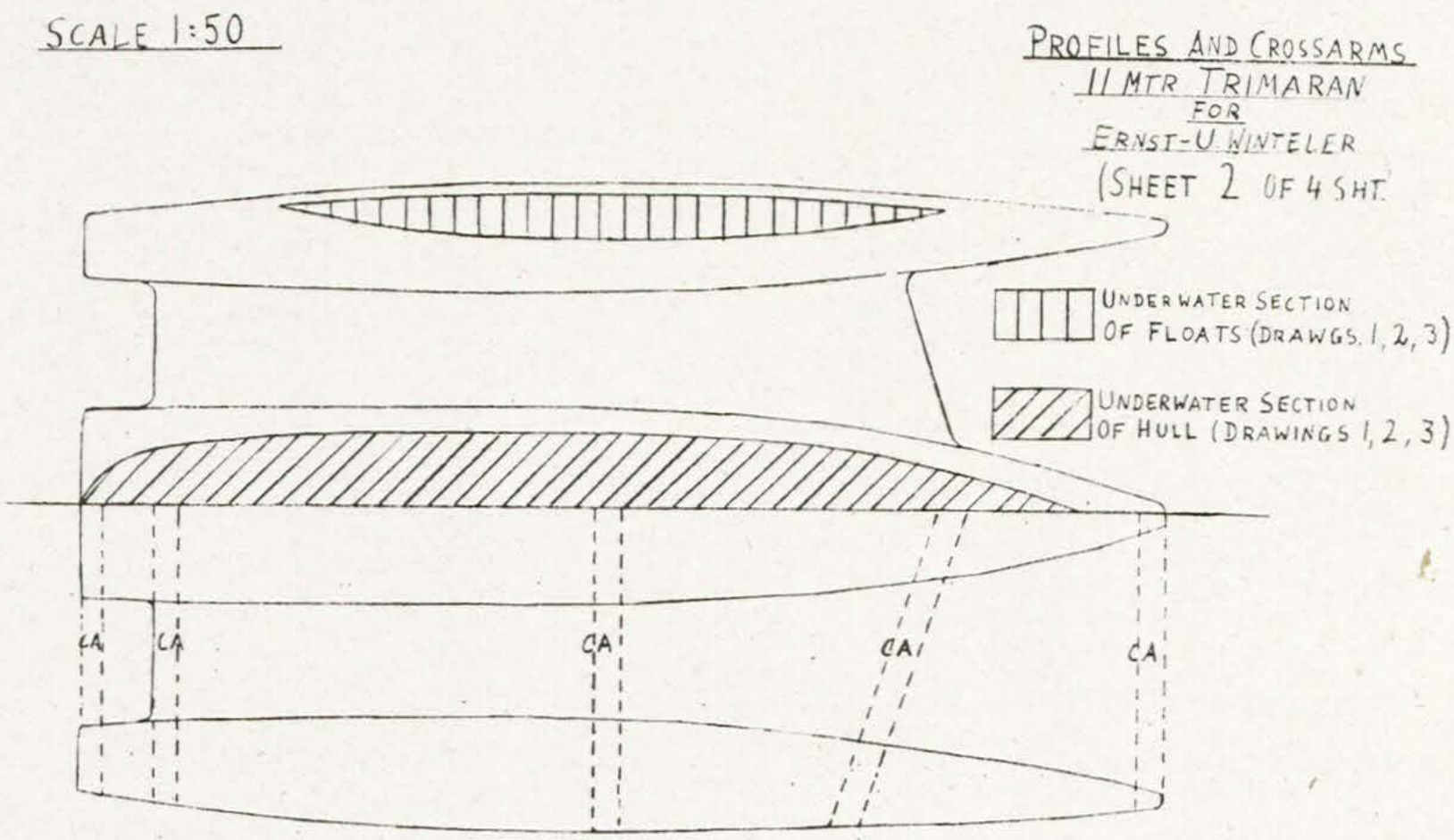


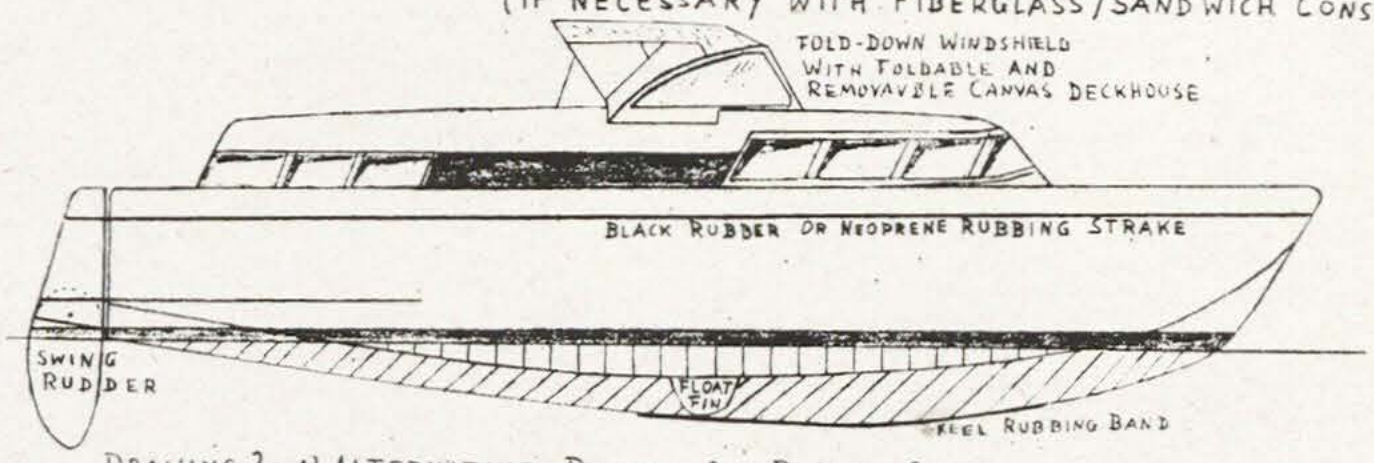
Fig. 1.

to make her as light as possible. Mr. Winteler lives aboard his yacht for long periods each year and wants a craft to commute between the Mediterranean and the Canaries. The deck space of the trimaran is therefore very desirable.

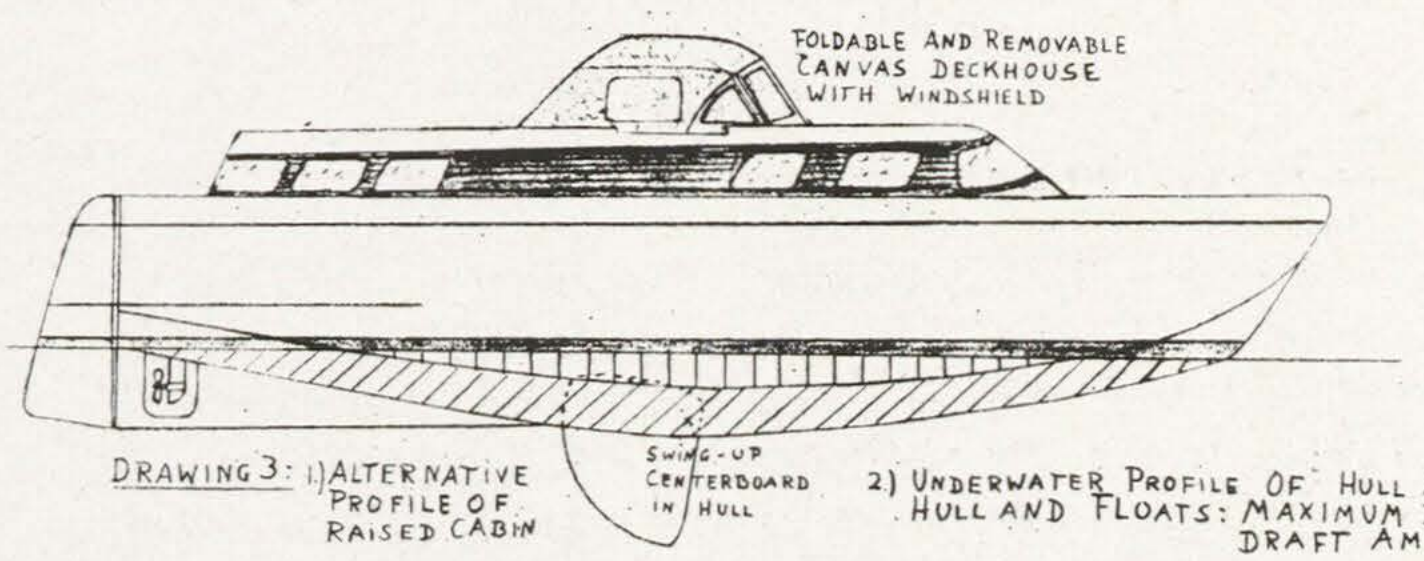
Hull Design. Having settled on the type of craft he wanted, Ernst read through all the A.Y.R.S. publications on the subject and has produced the design we show. Because this craft is not be be made of plywood, there is a lot of latitude in hull shape and a rounded right angled V was chosen for the main hull section which should give



DRAWING 1: UPPER HALF: WATERLINE OF HULL AND FLOATS
LOWER HALF: LOCATION OF CROSSARMS (CA) EXTENDING FROM FLOAT TO FLOAT
(IF NECESSARY WITH FIBERGLASS/SANDWICH CONSTRUCTION)



DRAWING 2: 1.) ALTERNATIVE PROFILE OF RAISED CABIN
2.) UNDERWATER PROFILE OF HULL AND FLOATS (DRAFT OF HULL: 0.70 MTR. ONLY)
HULL: MAXIMUM BEAM AMIDSHIPS. MAXIMUM DRAFT FORWARD OF AMIDSHIPS
FLOATS: MAXIMUM BEAM AND DRAFT AMIDSHIPS.

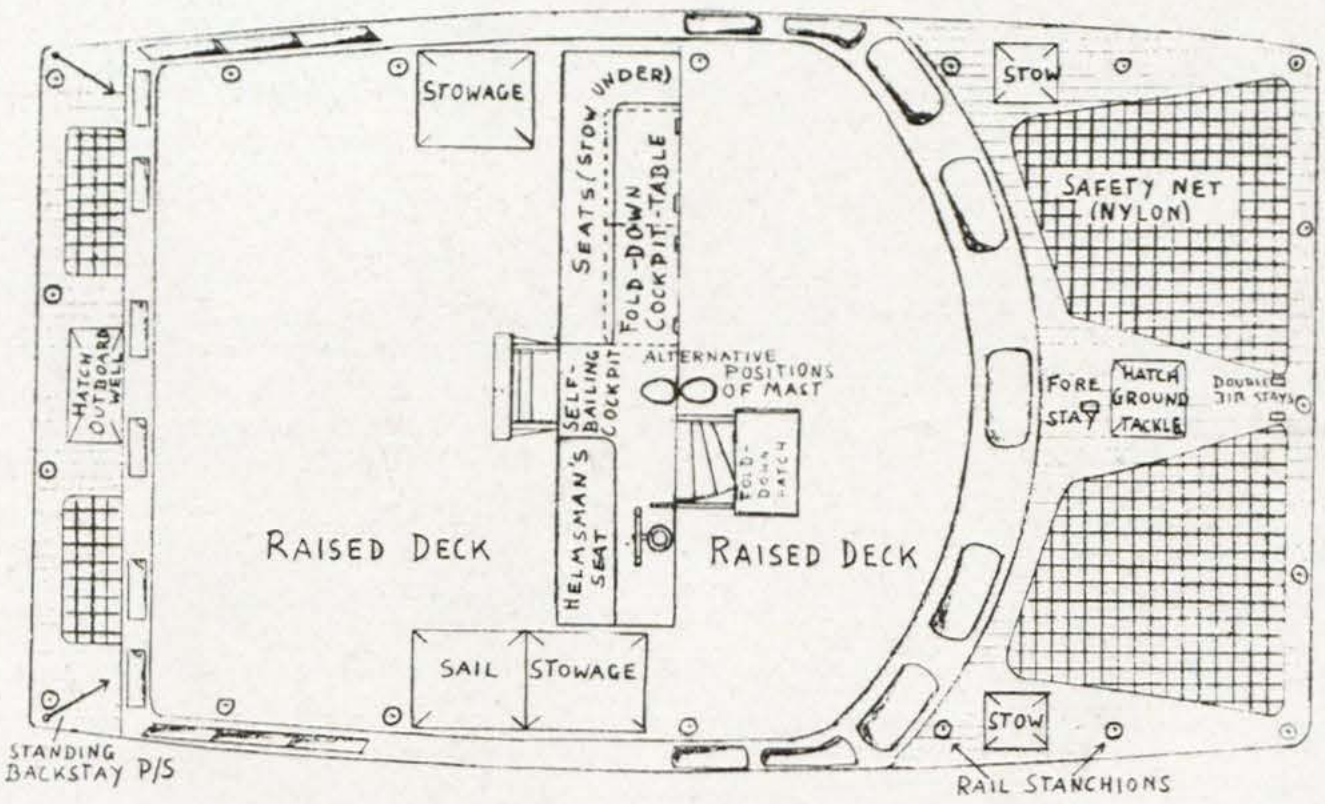


DRAWING 3: 1.) ALTERNATIVE PROFILE OF RAISED CABIN
2.) UNDERWATER PROFILE OF HULL AND FLOATS
HULL AND FLOATS: MAXIMUM BEAM AND DRAFT AMIDSHIPS

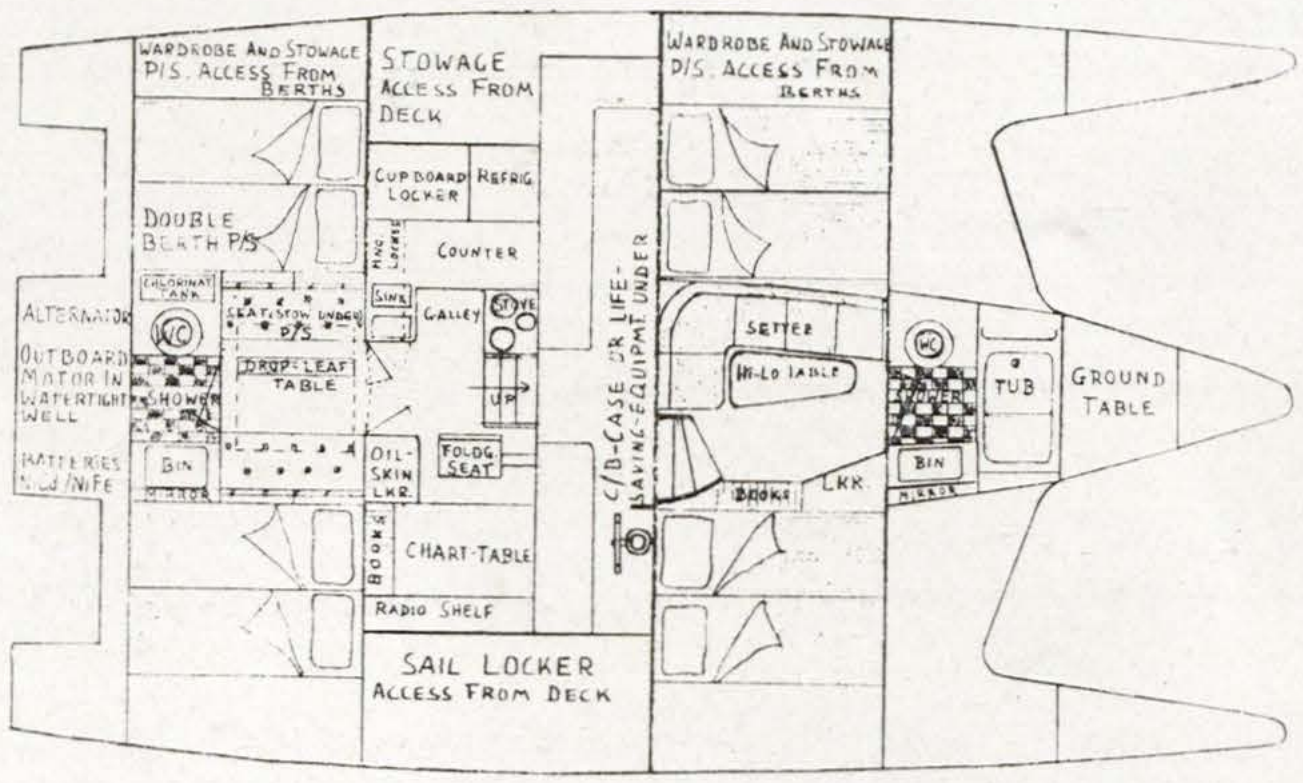
Fig. 2.

SCALE: 1:50

DECK- AND ARRANGEMENT PLANS
11 MTR. TRIMARAN
FOR
ERNST-U. WINTELER
(SHEET 3 OF 4 SHT.)



DRAWING 1: DECKPLAN
ALL SHEETS AND HALYARDS LEADING OVER RAISED DECK TO COCKPIT



DRAWING 2: ARRANGEMENT PLAN

Fig. 3.

a good performance with a possibility of avoiding a centreboard or fins on the floats. The immersion of the floats by only one foot will give good light weather sailing.

Floats of the same length as the main hull were selected and this produces a nice roomy craft as well as avoiding the frequent fault of floats which are too small. There will, of course, be some inter-

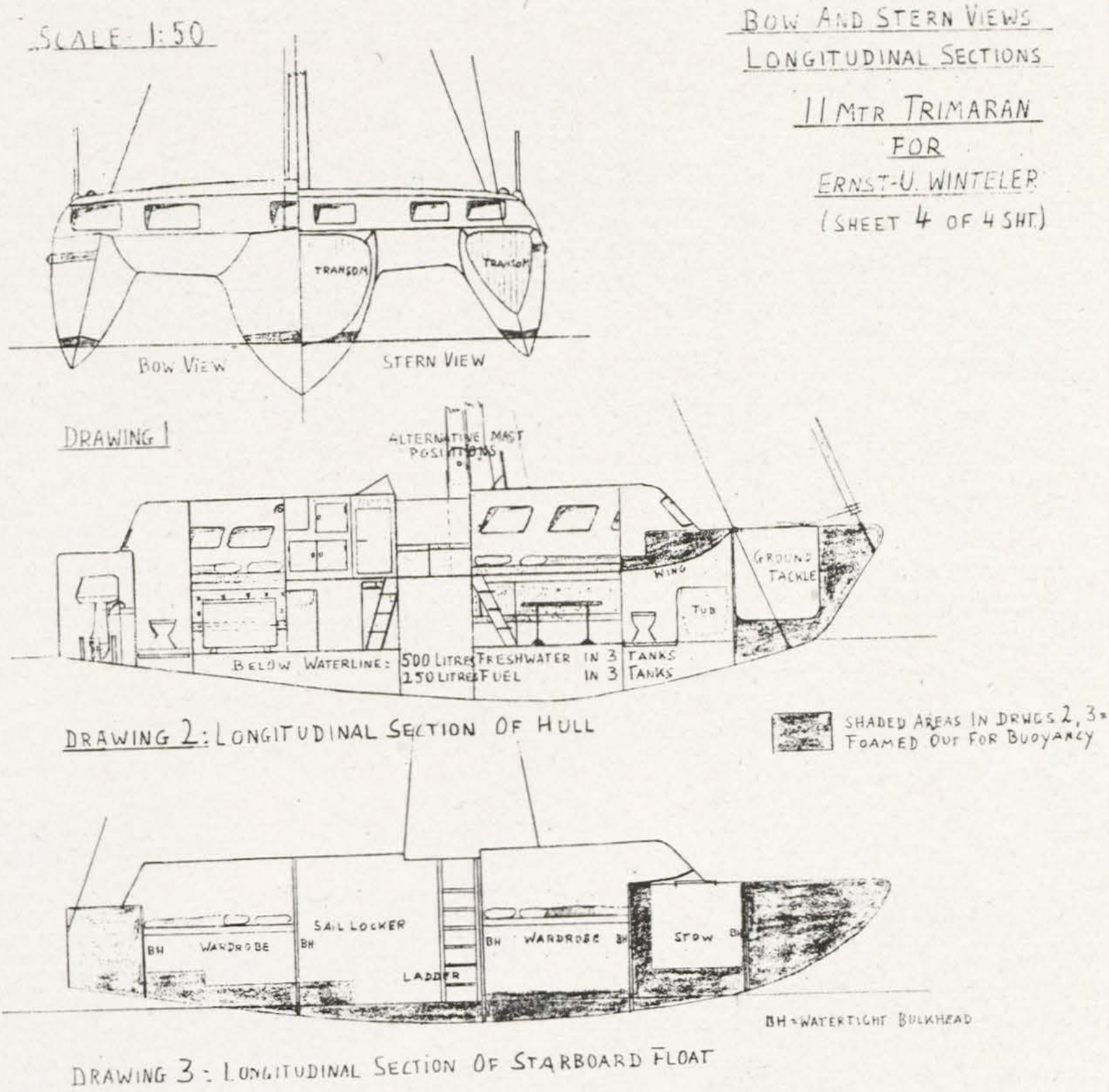


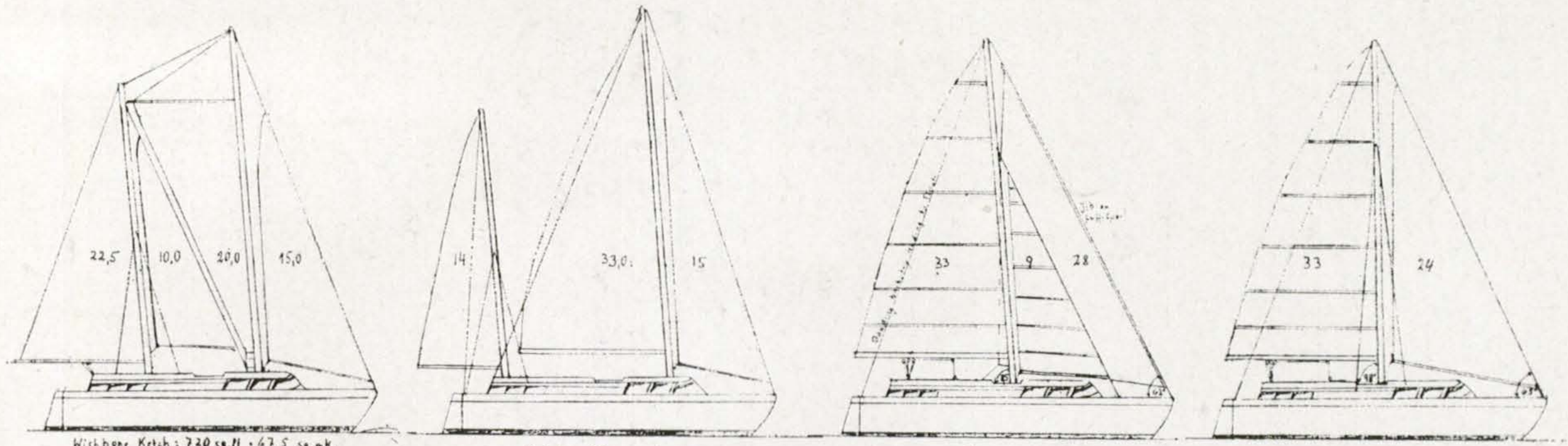
Fig. 4.

ference between the wave formations of the main hull and lee float, when close hauled but it is not likely to provide a hindrance below a speed of 12 knots. The floats are symmetrical but slope out to give lesser resistance when heeled.

The Accommodation. This is neatly arranged to give eight berths, two pairs forward and two pairs aft, each pair having a W.C. and ablutions room.

The Working Section. The cockpit, spreading almost across the yacht giving plenty of seating space for passengers and crew is a really nice idea. In cold and wet conditions, the canvas cover would make life very pleasant. Aft of the cockpit is the galley, chart table and lockers all nicely arranged for ease of working. For instance, the navigator's room and chart table are just behind the helmsman.

Alternative Sail-Rigs for 36' TRIMARAN by E.U. WINTELER

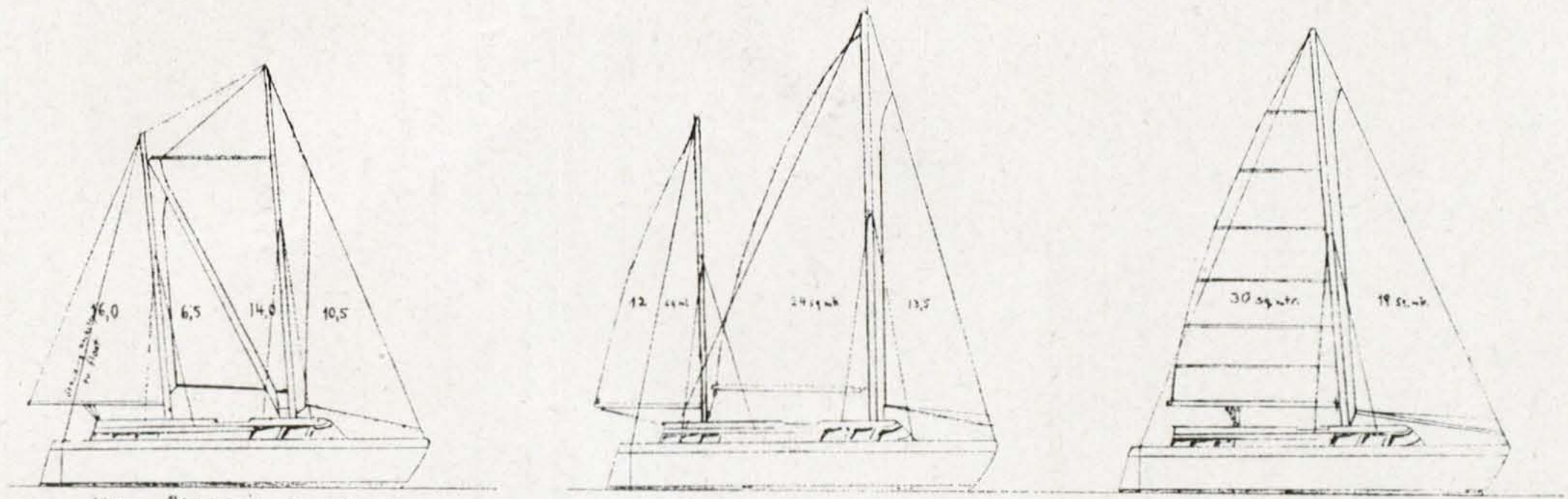


Wishbone Ketch: 720 sq.ft · 67,5 sq.mtr.

Ketch: 62 sq.mtr.

Cutter: 70 sq.mtr

Sloop 57 sq.mtr



Wishbone Ketch = 500 sq ft = 47 sq.mtr

Ketch: 49,5 sq.mtr.

Sloop (fully battened) : 49 sq.mtr.

Fig. 5.

The Sail Plan. We have been sent seven different sail plans with sail areas varying between 70 sq. meters (770 sq. ft. approx.) to 47 sq. meters (500 sq. ft. approx.). There would be trouble from the larger sail areas, I think and the smaller rigs of about 500 sq. ft. seem safer. The Wishbone Ketch rig looks the nicest to my eyes but it would be more expensive than the sloop and the foremast would come down right through the forward cabin. However, the ease of dropping the Wishbone sail and the snugness of the three lowers would be very comforting in a blow.

Summary. Ernst Winteler has designed a very useful trimaran with a lot of accommodation for her size. She should have a very good turn of speed and be easily handled. Ernst is a completely amateur designer and deserves great credit for his insight into the trimaran configuration.

Dear John Morwood,

Being now in the stage of having built a boat for me, the editorial of the A.Y.R.S. No. 44 keeps coming up into my mind, the more so, since I am always a bit doubtful about a trimaran which is not self-righting. With the same money which would cost me a trimaran I think I could have built a 40-ft. hull of the *Pelorus Jack* type.

What would *you* do for deepsea sailing? Build a 36 ft. trimaran or a 40 ft. *Pelorus Jack* type fitted with hydrofoil stabilizers of the trifoil type of Mr. Erick Manners? Do you think that this boat (*Pelorus Jack* hull plus trifoil stabilizers) can be designed to be self-righting under any conditions? Can the purpose of self-righting be obtained with a minimum of inside ballast or preferably by the weight of fuel and water tanks and engine installation? Will the craft fitted with the hydrofoil stabilizers also have stability if not sailing, e.g. heaving in a gale?

Do you know whether there has already been come practical experience with models or smaller boats of the *Pelorus Jack* type and stabilizers? In No. 44 you were sure that there would be enough interest for members to make these developmental stages.

I thought it would be more interesting for you to see such a boat built than a trimaran since you were the first one to advocate that type of boat. If you think that a 40 ft. boat could already be built either using the *Pelorus Jack* stabilizers or the trifoil stabilizers, without afterwards seeing that the whole thing won't work in that size, I would go ahead with it and would prefer it to the trimaran if it can be built self-righting.

Yours sincerely,

ERNST-U. WINTELER.

Meersburg/Bodensee, Sonnhalde 14, Germany.

Woodacres, Hythe, Kent.

Dear Mr. Winteler,

In your letter, you ask me a straight question and I must give you a straight answer.

Despite all the claims for the seaworthiness of trimarans which have been more or less proved by Arthur Piver and others, I myself would not choose one for deep sea sailing, the reasons being four. Firstly, there is the "Freak wave" which falling on the large deck area of the trimaran is more than likely to stave some of it in. This would not sink the boat, of course, but it would make things decidedly unpleasant. The second reason is the stern-over-bows capsize. Both of these are rare, of course. Thirdly, I disapprove of large boats which to my observation, are more "accident prone" than small boats. Now a 36 ft. trimaran is a much bigger boat than a 40 ft. *Pelorus Jack* type. Fourthly, though a trimaran is faster than the conventional yacht, I believe that the *Pen Duick II* type of yacht is faster than the trimaran when it is loaded with deep sea "clutter".

On the question of whether I would build a *Pelorus Jack* type, the answer is again "No". The procedure here is to build small boats of the type, gradually increasing in size till one reaches the proportions one wants. I am doing this myself by building a RYSA design and will slowly progress till I get the boat I want. At the moment, therefore, this design cannot be recommended, though perhaps F. M. Montgomery, Devoran, Cornwall, could design one completely for you. I know that I cannot. If so, an iron or lead outside "shoe-keel" could be made to give self-righting. Alternatively, a ballasted centreboard could do the same job more efficiently.

If then, you want to know my recommended alternative to the most excellent and beautiful trimaran you have designed without any chance of making a mistake of any importance, it is to buy a copy of *Pen Duick II* from Mallinson SNBCC B.P. Nantes, (Loire-Atlantique), France. The cost will be far less than your trimaran and the design is excellent, the only improvement which I see being that the aft overhang is a waste of boat and she would be faster if designed with the transom on the surface.

If you do decide to buy a *Pen Duick II* boat, you can add hydrofoil stabilisers of the RYSA design of A.Y.R.S. No. 44 and, should they be successful, you could then reduce the size and weight of the ballast keel. Non-buoyant low aspect-ratio stabilisers of the Manners pattern could be used alternatively but I am not over keen on them. However, you could well have a lot of fun experimenting with various types of stabilisers (I can invent quite a few types at will, all of which have some value). By not, however, altering the main structure of the boat, it would be impossible to spoil it and so your yachting enjoyment would not be spoiled, either.

JOHN MORWOOD.

TRIMAR 49

BY

L. MACOUILLARD

1 Aladdin Terrace, San Francisco, California.

Trimarans are still in the development stage and they will continue to develop for a long time to come. This is part of their fascination. Only by trial and error, by correcting faults and with occasional small

Trimar 49, *Louis Macouillard.*

successes do the enthusiastists keep going and make new converts—even among hard core conventional sailing people. Perhaps the perfect boat will never be designed or built and, if by chance it is, the odds against its universal acceptance would be slim indeed. Any boat is the result of many major and minor compromises. For example, if the cabin headroom is raised six inches does this increase the windage and, if not, does it affect the appearance of the profile perceptibly? Should the floor be lowered, sacrificing floor space to keep over-all height to a minimum? Again how much should the interior volume be reduced to gain a narrower and more efficient hull shape? And so it goes.

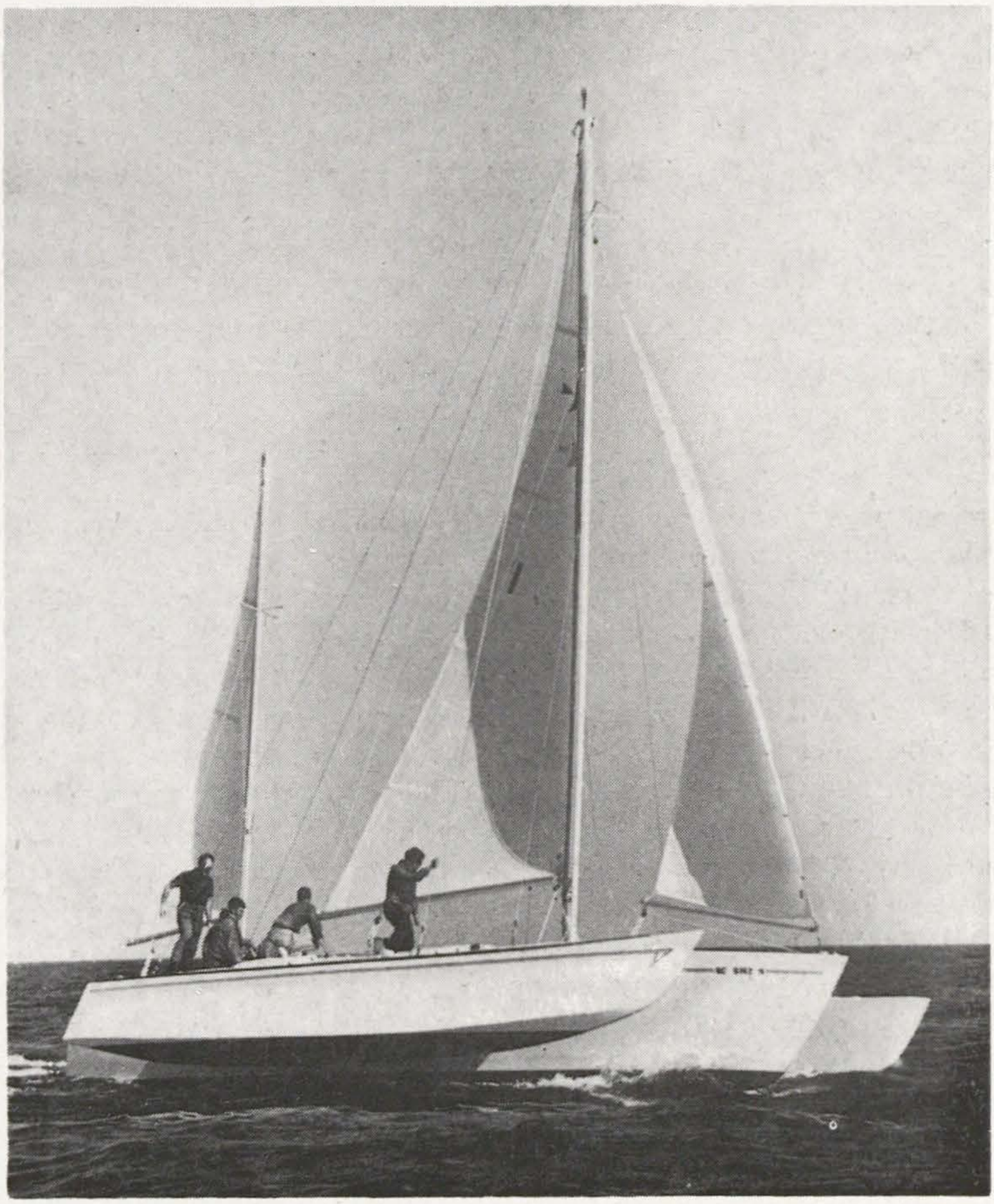
With this in mind, a short history of the *Trimar* 49 may contribute, in some small measure, to the general development of trimarans. The plans for the 49 were drawn up during 1960 and construction started in January, 1961 at the Mabuchi-Kensetsu boatyard near Yokohama, Japan. The completed boat arrived, via deck cargo, in San Francisco Bay five months later and we had our first shakedown trials in June. We immediately found the boat to be about twenty-five per cent. heavier than planned. The builders, not having handled this type of construction previously, had beefed it up in many places unnecessarily, leaning over backward to be on the safe side. I also had many doubts at the last moments and specified $\frac{3}{4}$in. planking along with heavier sections, so the weight was increased in proportion to these decisions.

Consequently, the shakedowns were somewhat disappointing. In addition to not being as fast as anticipated she seemed unresponsive. Part of this was due to the fact that we had been conditioned to the fast lively *Trimar* 24s. In any event, major surgery was called for. The first logical correction was to increase the horse-power by adding to the sail area. We disposed of the original 42 ft. mast and installed a new hollow spruce spar that reached 50 feet above the deck, increasing the mainsail area about twenty per cent. Next, we bought a used Ratsey genoa of 450 square feet that fell a few feet short of being masthead. We reduced the size of the rudder—an oversize rudder produces a braking action when turning. We also disposed of the splashboards along the bow of the main hull and reduced the size of the splashboards on the floats, as they tended to create turbulence.

We took the 49 out again and nice things began to happen. In the brisk summer breezes on the Bay, she seemed to fly and at times we logged over 18 knots. In the steep swells outside the Golden Gate she proved to be dry and weatherly. Actually, there the extra weight was an advantage. She produced a very comfortable motion in those lumpy seas, no hobby-horsing or snap-roll, and came

about quite handily. In very strong winds under staysail and mizzen, only, the boat balanced well and was practically self steering. The mizzen sail took the place of the helmsman.

One nagging fault that persisted was a tendency to make leeway or to crab in light airs This was not so apparent in winds over 15



Trimar 42—*Note Float Shape.*

knots, when the long flat side of the leeward float was partially submerged. The centreboard has an area of 17 sq. ft. when at maximum depth and, as this is impractical to increase, the obvious solution is to remove the centreboard entirely and substitute a fixed skeg to double, at least, the lateral plane. This might increase the turning circle

somewhat but in a cruising vessel this is not too significant. Centre-boards, while desirable in small high performance craft, are always a problem on larger boats; besides the difficulty of maintenance, the well takes up a very considerable amount of useful space.

The *Trimar* 49 proved to be surprisingly able in competition against a *Choy* designed racing/cruising catamaran of about 40 ft. On a seventy mile, overnight offshore race, in moderate to very light winds, we found ourselves to be approximately half a mile ahead when dawn broke. Subsequently, an absolute calm developed and both boats decided to motor the last ten miles to the finish line.

Several times, when pitted against another forty ft. cat, the 49 easily passed her without the use of the big genoa and, also, proved much faster in coming about. True, on one occasion the cat carried about twenty passengers to our fourteen. Incidentally, the 49 does not wish to swing from a broad reach through the eye of the wind without hardening up, to some extent, on the mainsail and the mizzen.

There is a dearth of racing competition for the larger cruising catamarans and trimarans in these waters because the interests of the present owners do not lie in this direction. As a result, it is difficult to obtain very much significant performance data. This does not reflect on the sailing ability of these people, but rather on the lack of an enthusiastic sponsor capable of organizing a suitable racing programme.

Data on *Trimar* 49:

L.O.A. Main Hull, 49 ft.
Beam, Main Hull, 7 ft.
Beam W/L, Main Hull, 4 ft.
Extreme Width, 24 ft.
Draught (centreboard up), 3 ft.
Draught (centreboard down), 6 ft.
Weight, approx. 12,500

Mainsail, 375 sq. ft.
Mizzen, 135 sq. ft.
Staysail, 160 sq. ft.
Genoa 1, 300 sq. ft.
Genoa 2, 475 sq. ft.
Powered by 18 h.p. Evinrude outboard through a well.

As a prototype and an experimental craft, the *Trimar* 49 has proved to be most rewarding. Apart from giving us three years of enjoyable sailing and cruising, the experience gained has been invaluable. This information has been incorporated into the designs for the new *Trimar* 40 and the *Trimar* 40 *Mark II*. For example, the 49 has six single berths while the 40 has four double berths, plus a seven-foot settee that can be made up as an extra berth. The 40 galley is larger, with ample food storage within easy reach. The engine compartment is separated from the living areas by water-tight and fume-tight bulkheads. The inboard engine (optional) does not affect the cabin plan to any extent. The wheelhouse can

be a permanent installation or a convertible shelter. Either way, the helmsman has unobstructed vision, unlike some multi-hulls where the unfortunate man at the tiller has to stand in order to see over the deckhouse. The 40 has a fixed skeg to give efficient lateral plane, also permitting safe beaching and easy maintenance. Through improved engineering, the usual beam connecting the hulls has been eliminated, allowing stronger, cleaner construction and the camber of the decks adds up to even greater strength. The weight of the 40, including a reasonable payload, will still be under approximately 7500 pounds.

The first *Trimar* 40 is now being completed and the shakedown sailing should take place around the first of the year. We would settle for a performance equal to that of the 49, although everything points to an improvement on this record.

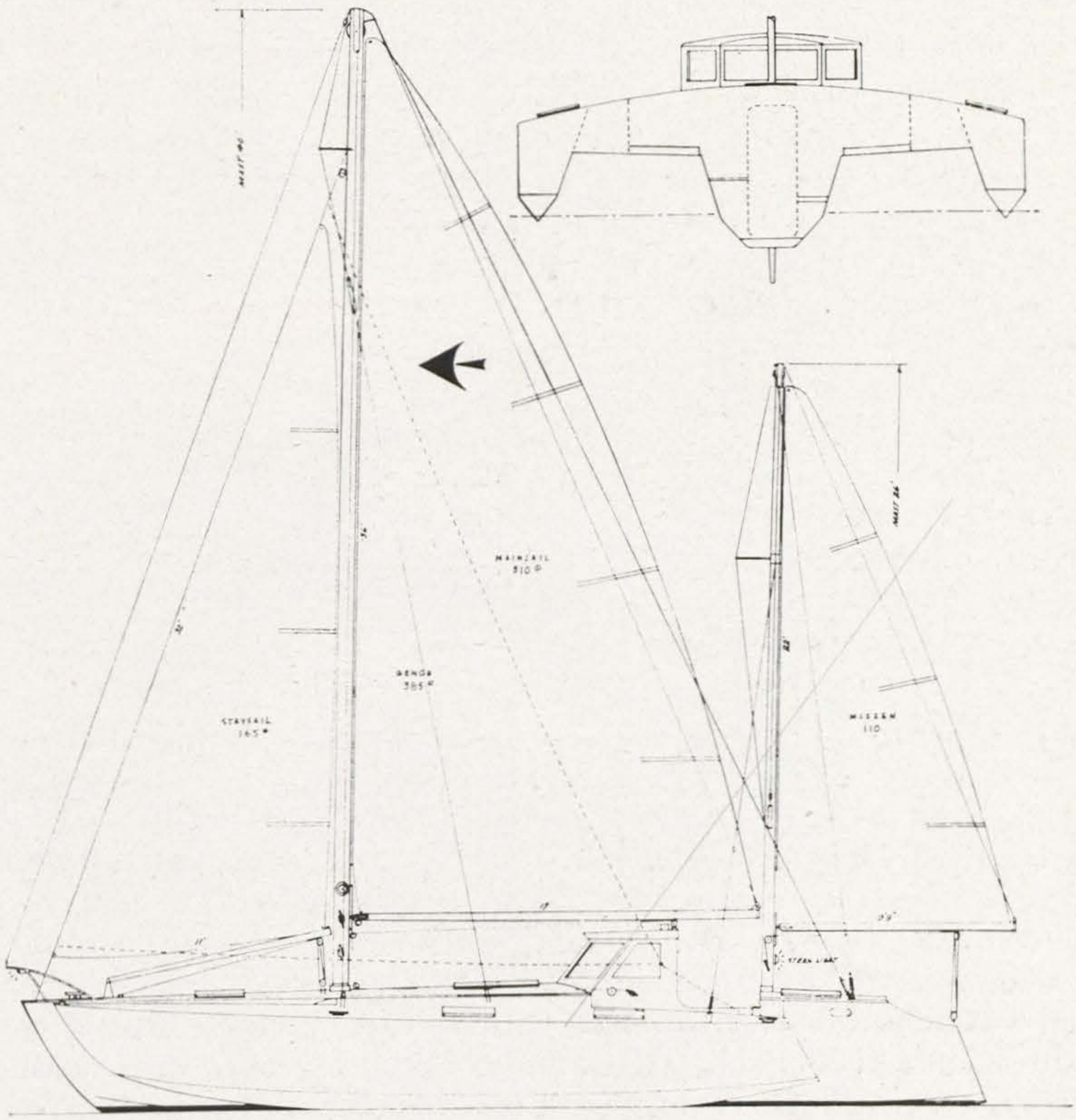


Fig. 1. *Trimar* 40 *MK II Sail Plan.*

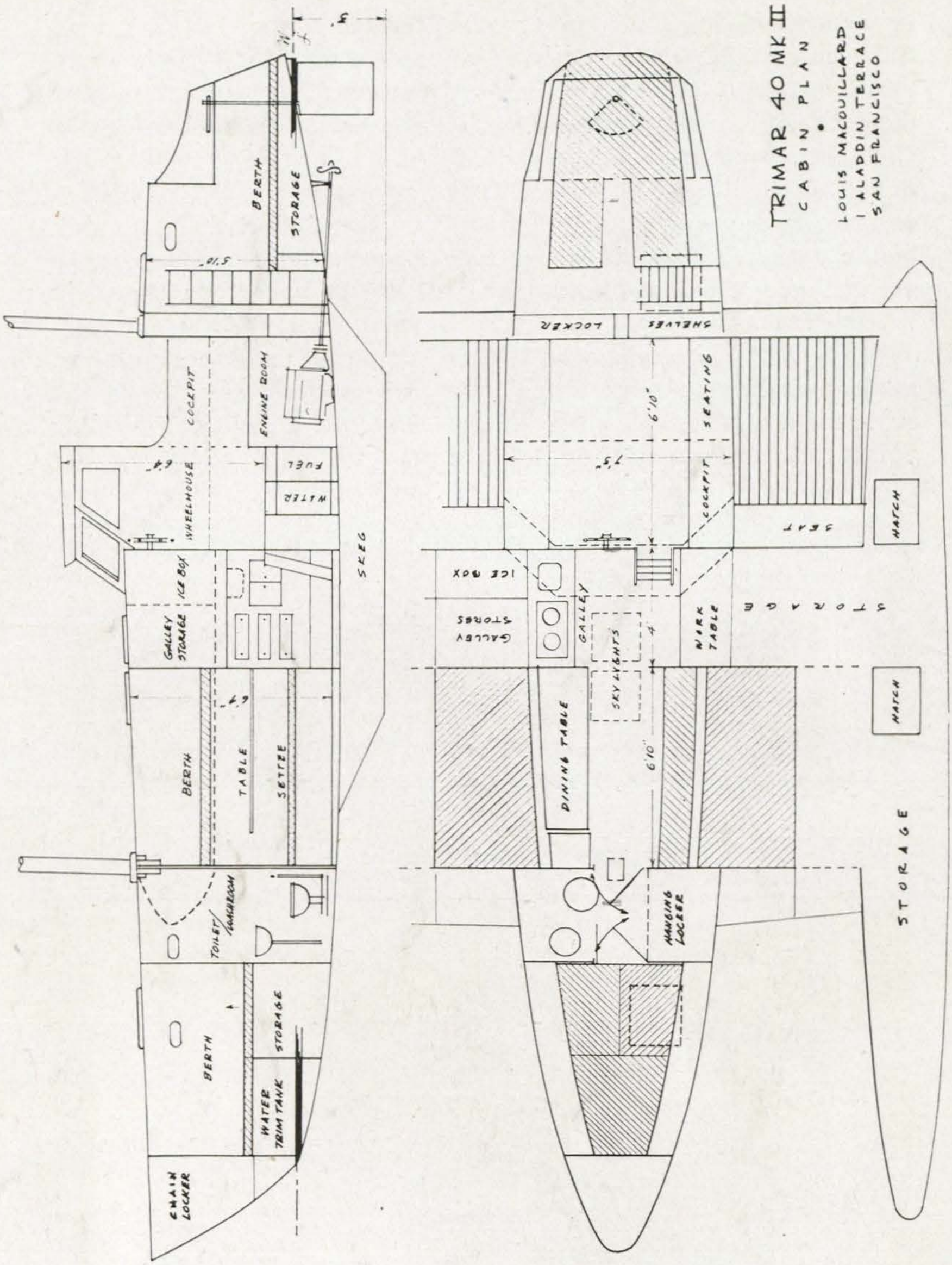


Fig. 2.

Occasionally, people ask why the emphasis on speed when they only want a comfortable, safe cruising boat. I believe that a fast boat is a more efficient boat; that it is a safer, more pleasurable boat in which to cruise. As with a car, reserve power produces the desired

or necessary speed with greater safety and less strain, with less wear and tear. A sailboat under shortened sail must still handle smartly, saving its maximum performance for ideal sailing condition. It is also satisfying and economical to slip along at 12 to 15 knots, while under auxiliary power, instead of lumbering along at the usual 5 or 6 knots achieved by the single hullers. But let us not deny, either, the pure joy and thrill of sailing a very fast boat; to almost take off—to sail *over* rather than *through* the water—to pass all of the other sailboats and even, on occasion, a power boat ! Perhaps this would be a good time to compare, briefly, the relative merits of trimarans and catamarans in the cruising category. There is little question of the present superiority of the small racing cats over anything else that attempts to sail. But, a 20 ft. high-performance cat cannot be doubled in size and end up as a comfortable seaworthy craft. The attempt to gain adequate headroom often results in a high ungainly superstructure (see drawings A and C). Also, the span between the cat hulls is relatively wider and this tends to create some structural problems

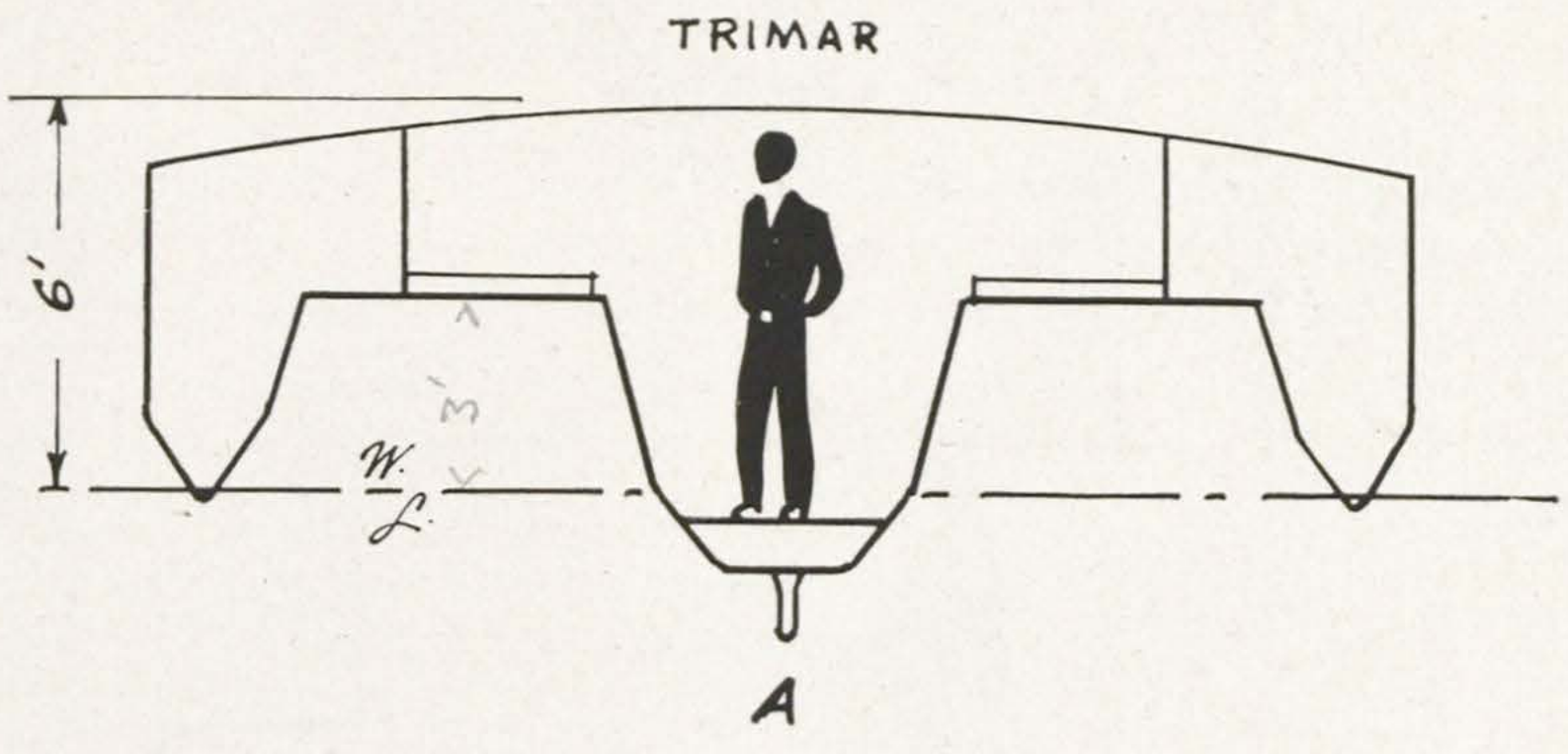


Fig. 3.

In a trimaran, the main hull indicates to the floats: in a catamaran, both hulls are in competition with each other, making steering more difficult. However, the greater beam of the trimaran results in a slightly heavier craft and also may limit the mooring facilities in crowded harbours.

There have been some exaggerated claims made for trimarans which have not been backed up by accomplishment. These overstatements have caused doubt and even cynicism with many people who, otherwise, would be willing to admit the potential of the trimaran.

On the other hand, there is the understated performance of Richard Newick from the Virgin Islands. In his 36 ft. "*Trice*", a trimaran of his own design, he placed third, boat for boat, in the last Bermuda race against 143 entries. He accomplished this under

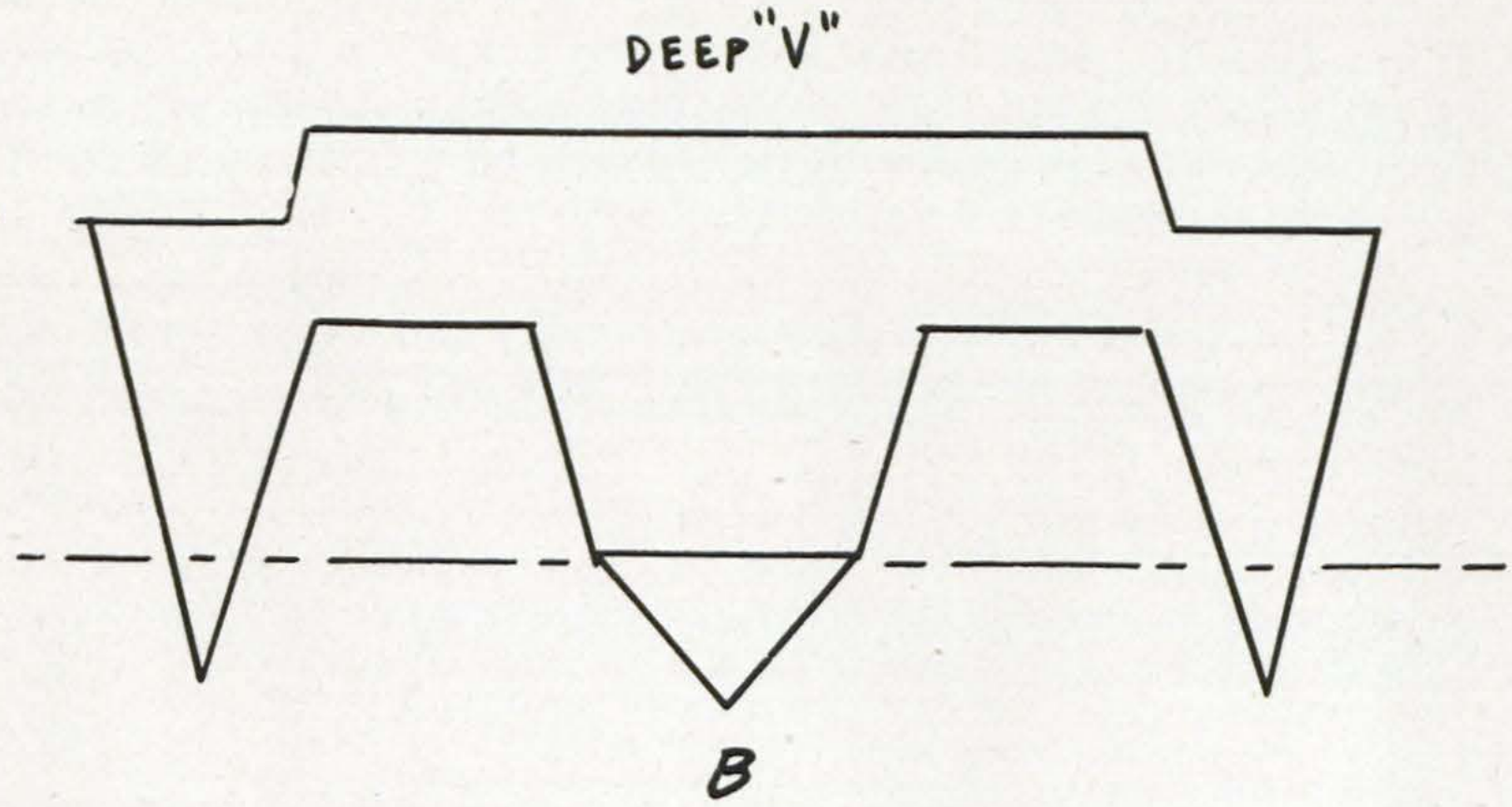


Fig. 4.

unfavourable conditions—light winds forward of the beam most of the way. Although he was an unofficial entry, this feat was well noticed and will certainly give trimarans the credit they so well deserve.

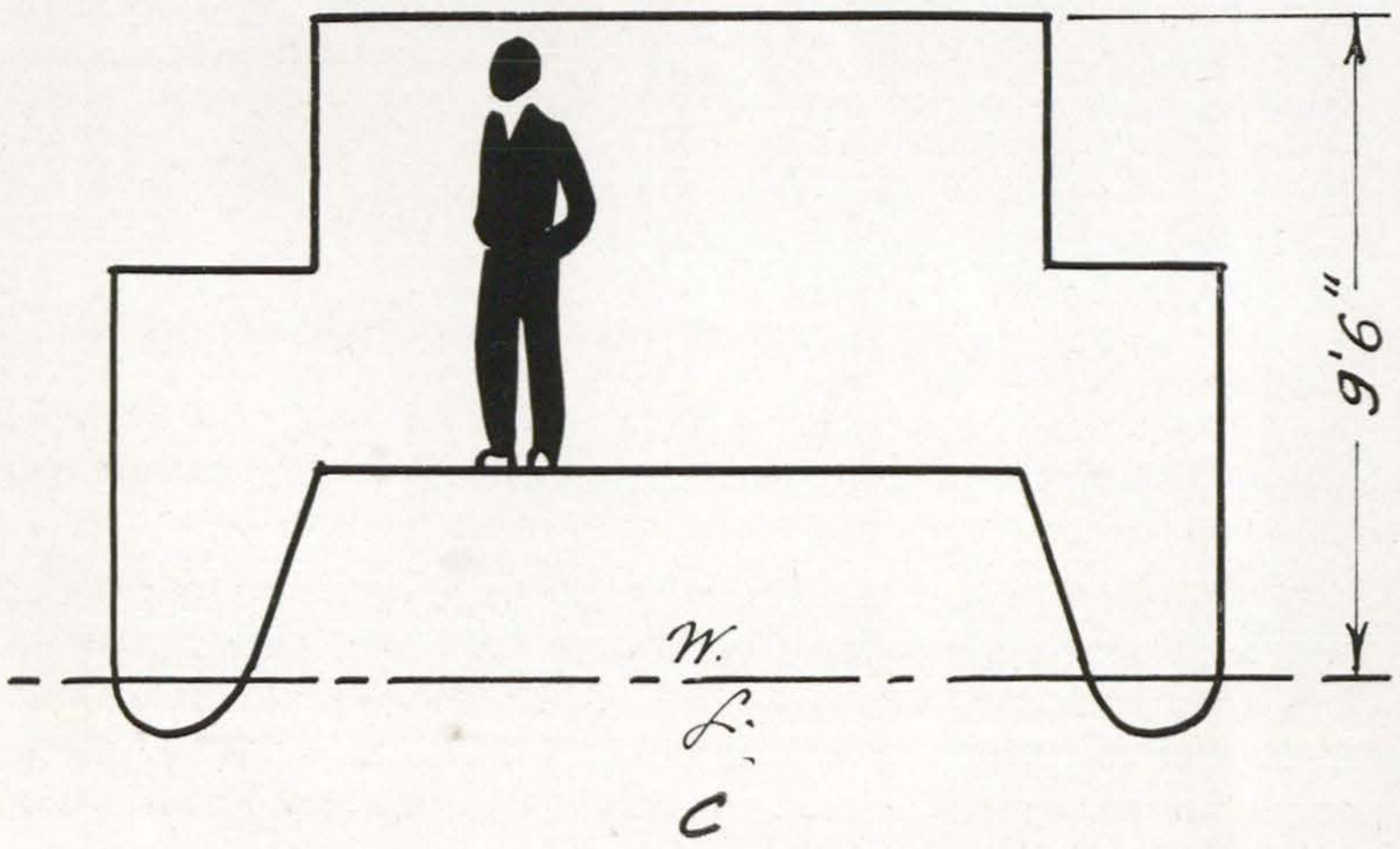


Fig. 5.

To summarize in a few words:

A cruising trimaran must be seaworthy, sail well to windward, have comfortable accommodations and also be pleasing to the eye. Lightness of construction is important but not to the exclusion of safety. A split rig (ketch or yawl) is desirable. Overburdened multi-hulls are dangerous (rigging failures or capsizing) therefore various combinations of sails must be available. For straight downwind courses either twin headsails or a spinaker is necessary. The floats are more efficient when they barely touch the water while on an even keel. This prevents excess drag and helps eliminate a snap rolling action. Trimarans with deep "V" sections are actually three-hulled vessels (see sketch B). A centre well cockpit permits constant trim regardless of the number of passengers, and the resulting divided cabin has many advantages. Excess leeway must be prevented by sufficient lateral plane. The best available materials are not always good enough.

Dear Sir,

The enclosed drawings show our latest trimaran versions. We have made a definite effort to make these the most elegant of boats. We figured that was about all that was lacking.

These boats will be available only professionally-built. They are far harder to build than our usual line—which we retain for the amateur builder.

Regards,

P.O. Box 449, Mill Valley, California. ARTHUR PIVER.

MARINER—25 FT. TRIMARAN AUXILIARY

This small Trimaran Cruising Sailboat was designed by Arthur Piver of Mill Valley, California, "partly as a protest against use being made of our 24 ft. *Nugget* Trimaran by certain owners.

"*Nugget* (with sail numbers now running into the seven hundreds) was designed as a fast day-sailer", he states, "but some people have been apparently so anxious to have a small inexpensive cruising Trimaran that they have been overloading their *Nuggets* with all sorts of structures and gear which can seriously impair this boat's usual flashing performance. We hope that now those particularly interested in cruising will permit *Nugget* to assume her intended role.

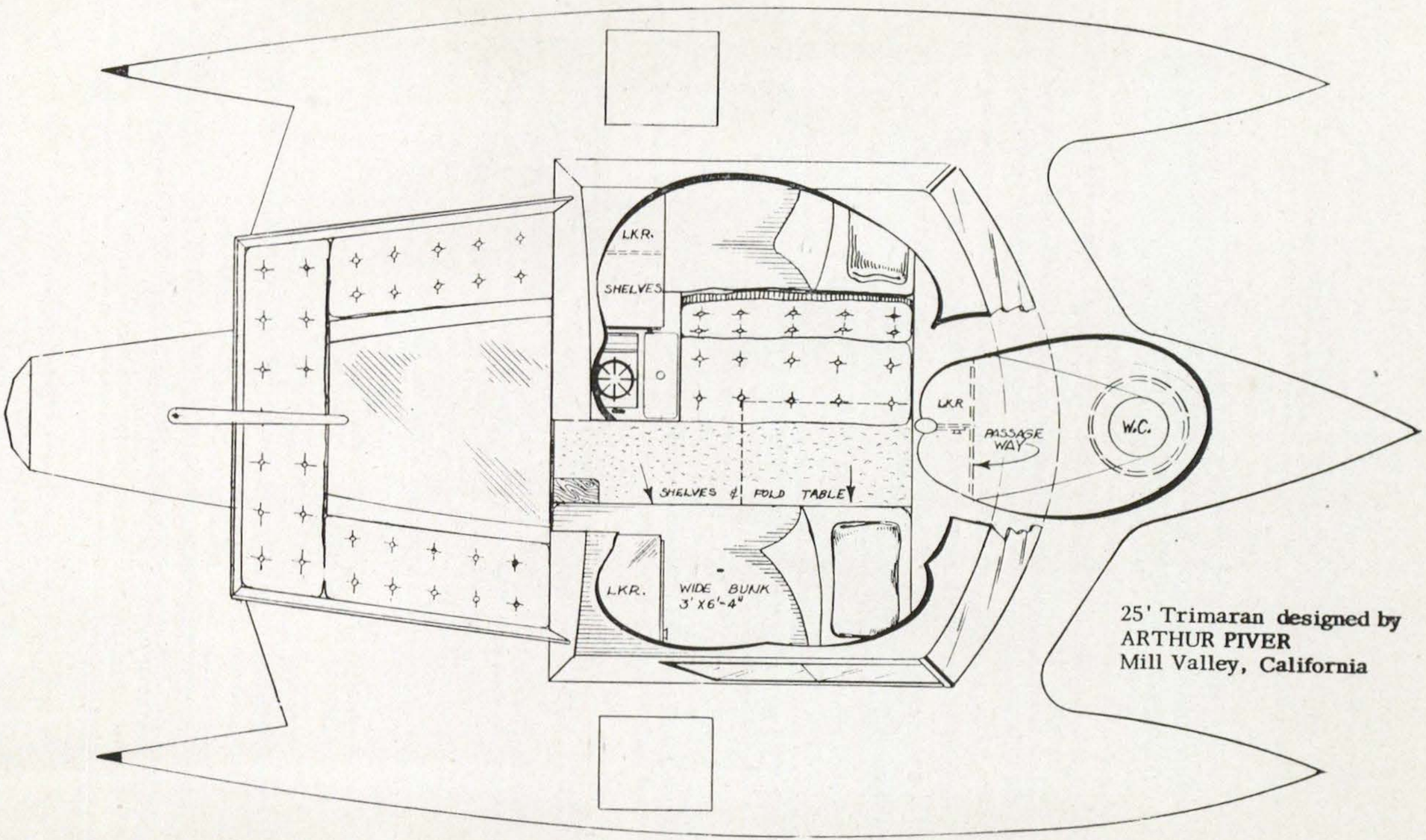
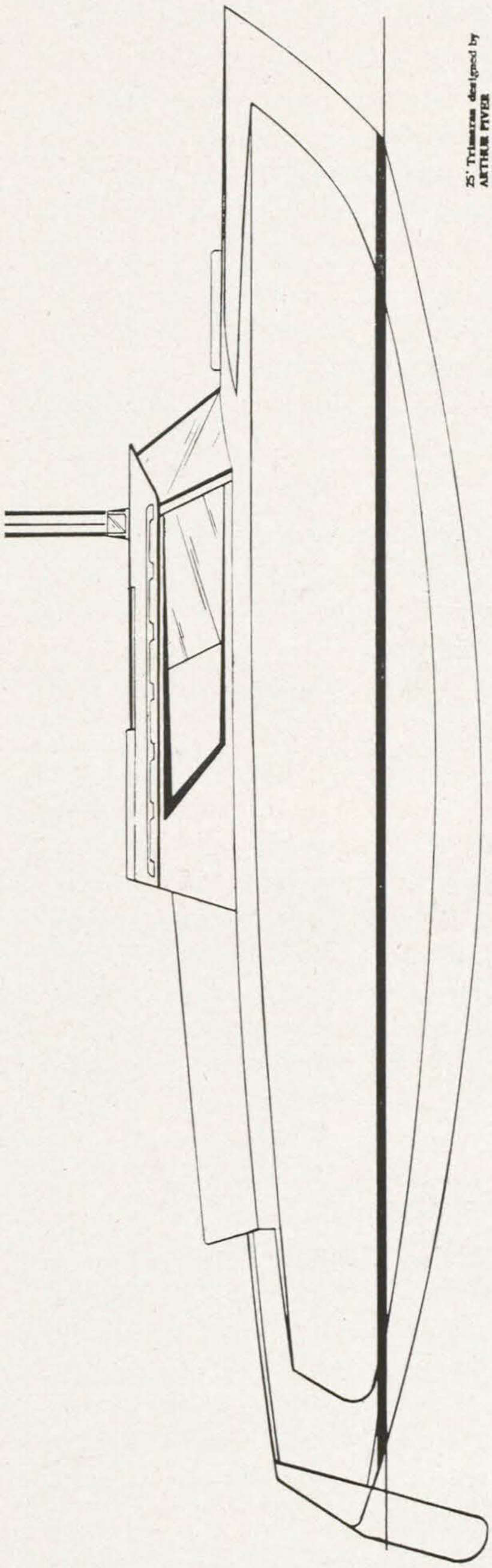


Fig. 1. 25' Trimaran designed by
ARTHUR PIVER
Mill Valley, California



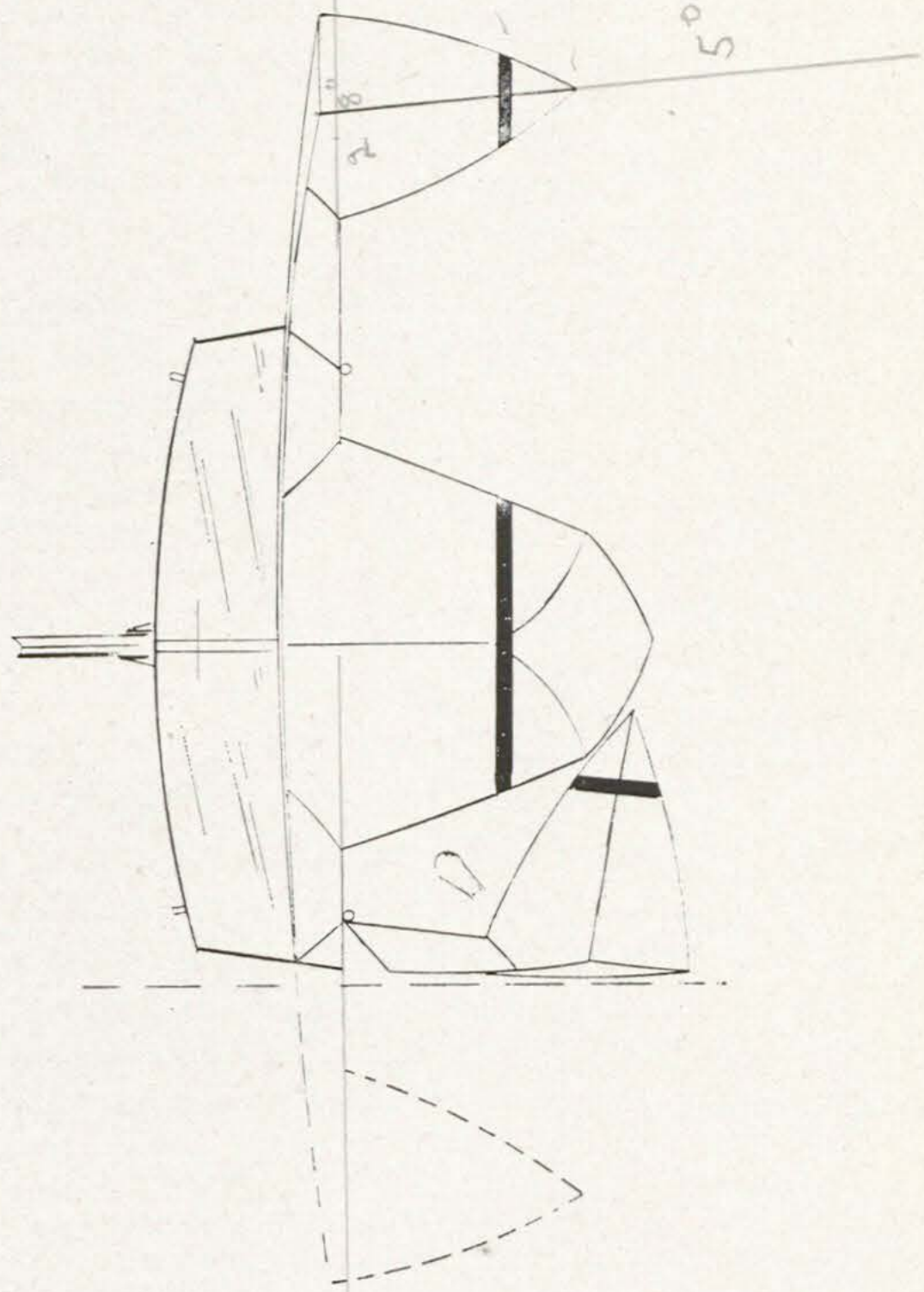


Fig. 2. Piver 25, Aft Cockpit.

"The new 25-footer is a small edition of our 46 ft. *Trident* motor-sailer, and can indeed be used as a miniature motor-sailer itself.

"Another factor which can make cruising under sail a flexible operation is ready trailability We could have previously designed trailable cruising Trimarans with detachable floats—but with them an entire gang of men is required for assembly. Hinging as shown is far simpler.

"We now have Trimarans which can carry considerably more weight than heretofore—without increasing draft nor widening the slender hull shape which makes these boats so fast under sail."

Lines as shown are for professional building, with elliptical development. A similar boat with lines for easier amateur construction is also offered. Basic material is plywood—fiberglass-sheathed.

Statistics remain the same for both versions: LOA, 25 ft.; Overall Beam, 15 ft.; Trailable Beam, 8 ft.; Draught (Board Up) 19 in.; Sail Area, 250 ft. Auxiliary power may be either outboard or fixed engine with V-drive or feathering propeller.

PIVER 30 FOOT, 35 FOOT AND 40 FOOT DESIGNS

It would appear that trimaran sailors are divided into two classes. The first are those who like to steer with a tiller from an after cockpit, and secondly there are those who like to steer with a wheel in a wheel-house, with a convertible top From a designer's point of view, there is little to be said for the aft cockpit and tiller. Visibility is bad, the crew weight is in the wrong place and lots of good hull space is lost to the accommodation. In general, the aft cockpit is preferred by pure sailors who use outboards for power while the wheel steering is preferred by people who demand heavy inboard engines To meet these two types of people, Arthur Piver has produced designs to be made professionally of each type in the 30 foot, 35 foot and 40 foot sizes.

Hull Design. In all his modern designs, Arthur Piver seems to have dropped his chines below the L.W.L. which will not only reduce the wetted surface but will increase the displacement without increasing the draught. The overall designs now show a distinct air of elegance and line—a process called "Styling", I believe. The results are a far cry from the original *Nugget* and the *Nimble* which sailed across the Atlantic in 1960 and are yachts of which many people will be very proud.

Float Design. This is the original deep Piver V but in some

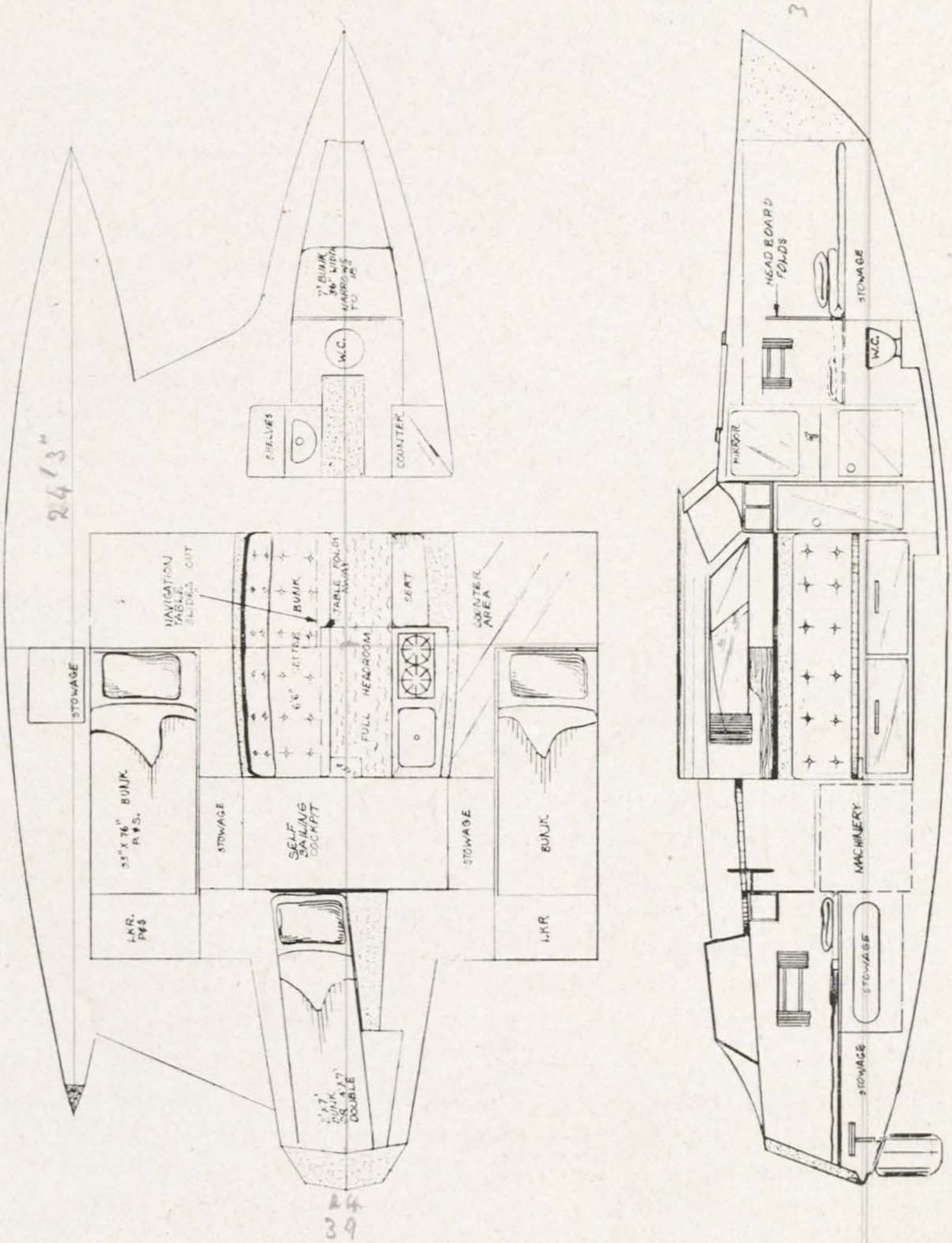


Fig. 3. Piver 30 Wheelhouse Type.

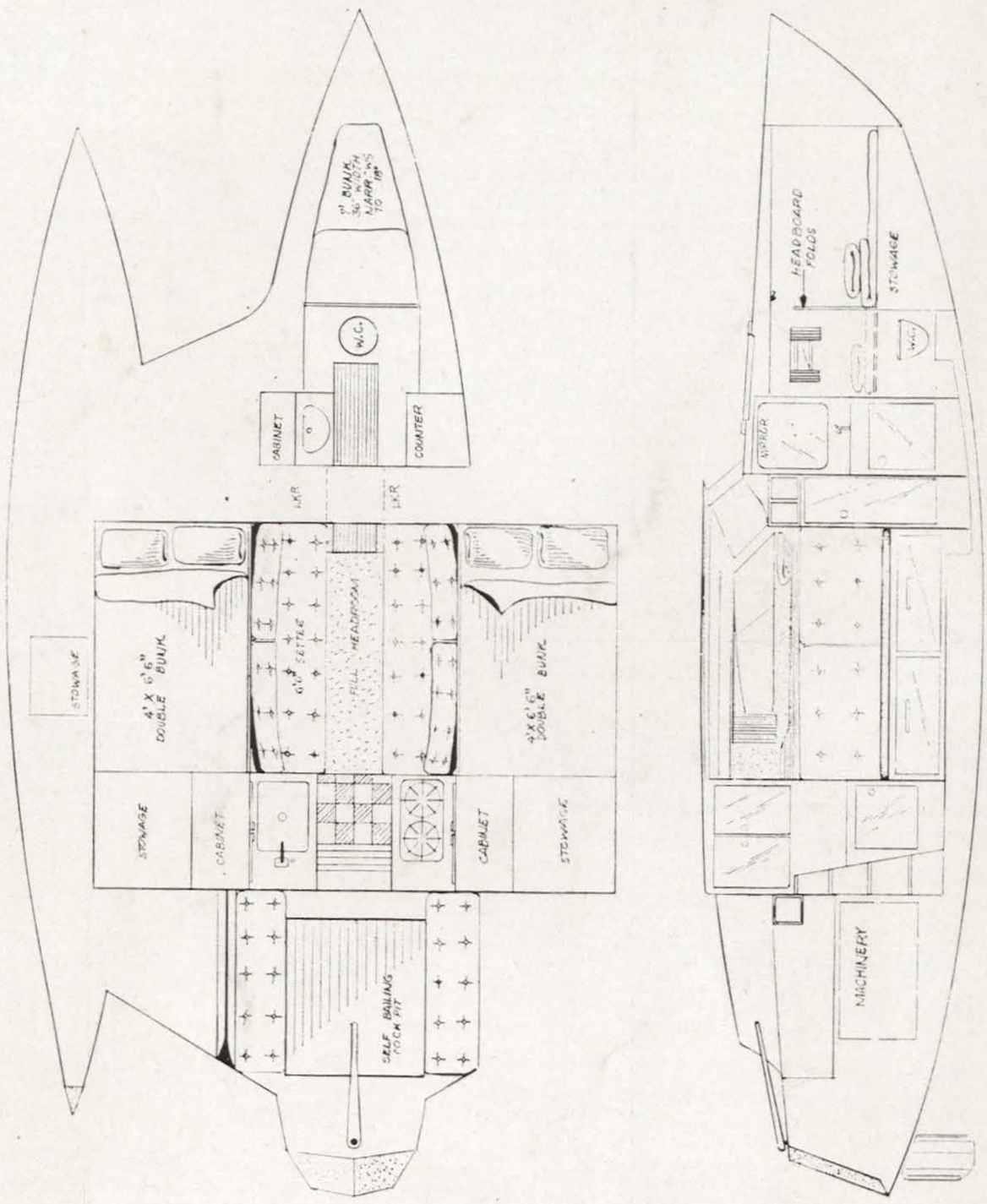


Fig. 4. *Piver* 30 *Aft Cockpit.*

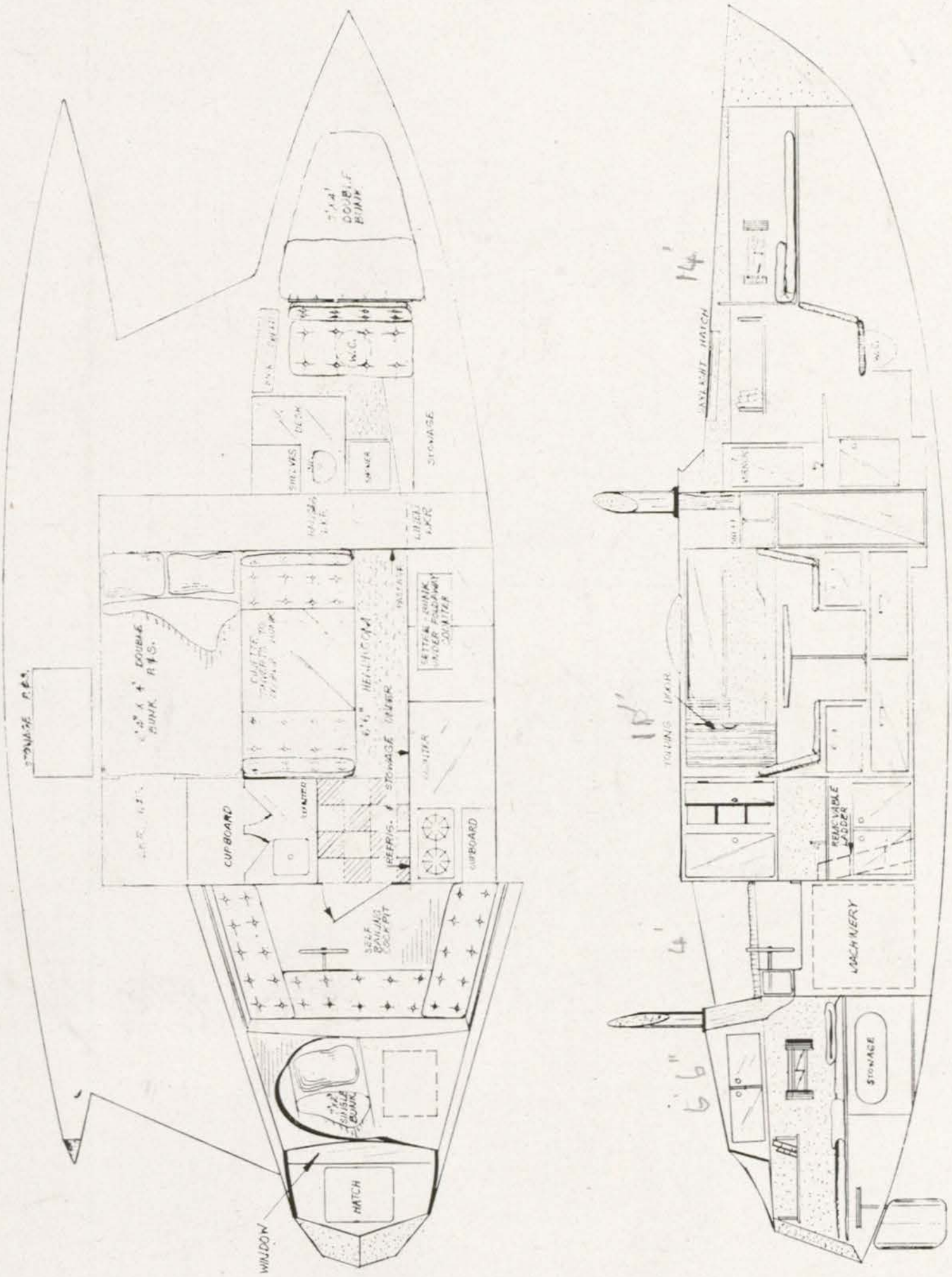


Fig. 5. Piver 35 Wheelhouse Type.

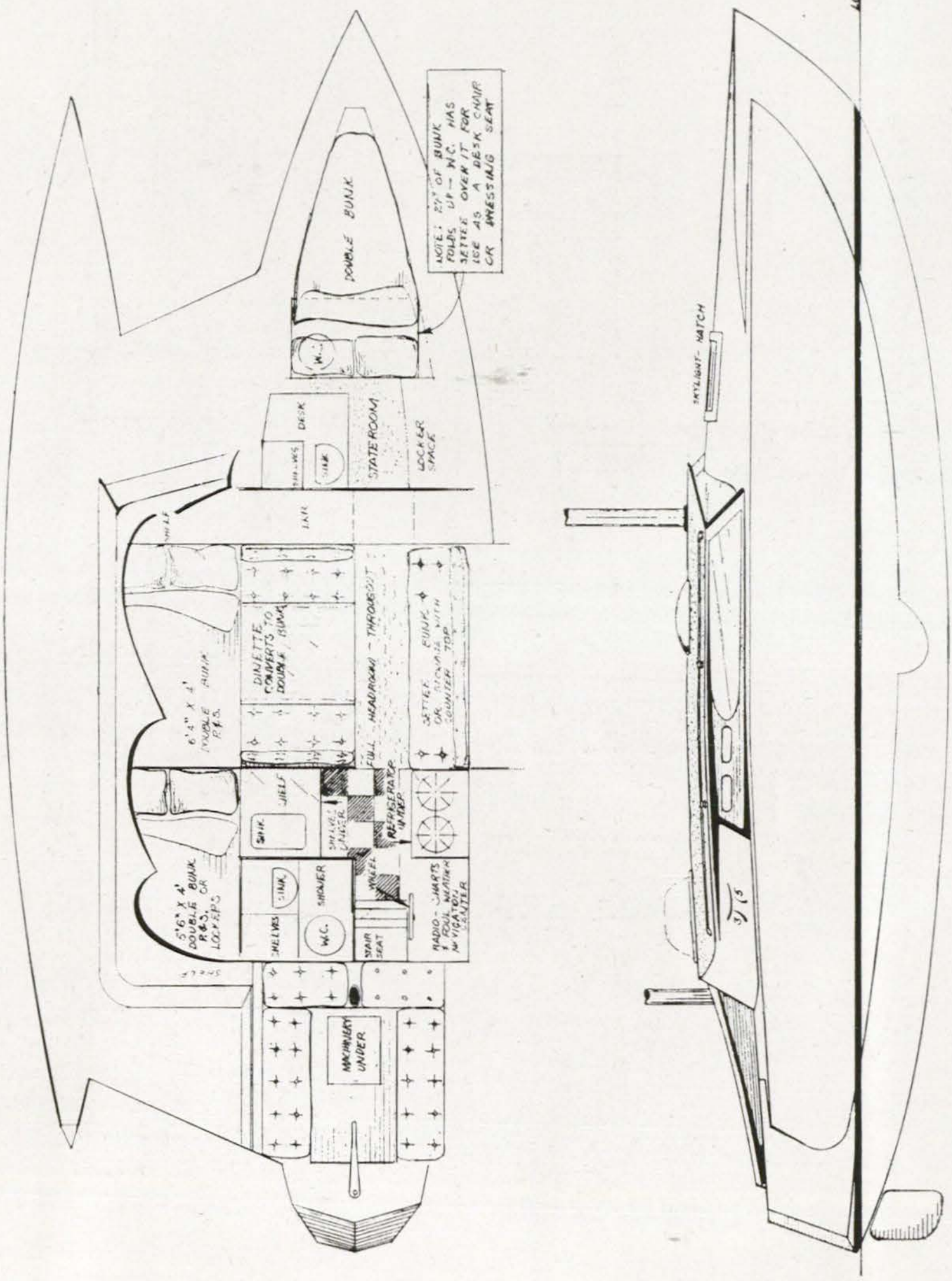


Fig. 6. *Piver* 35 *Aft Cockpit.*

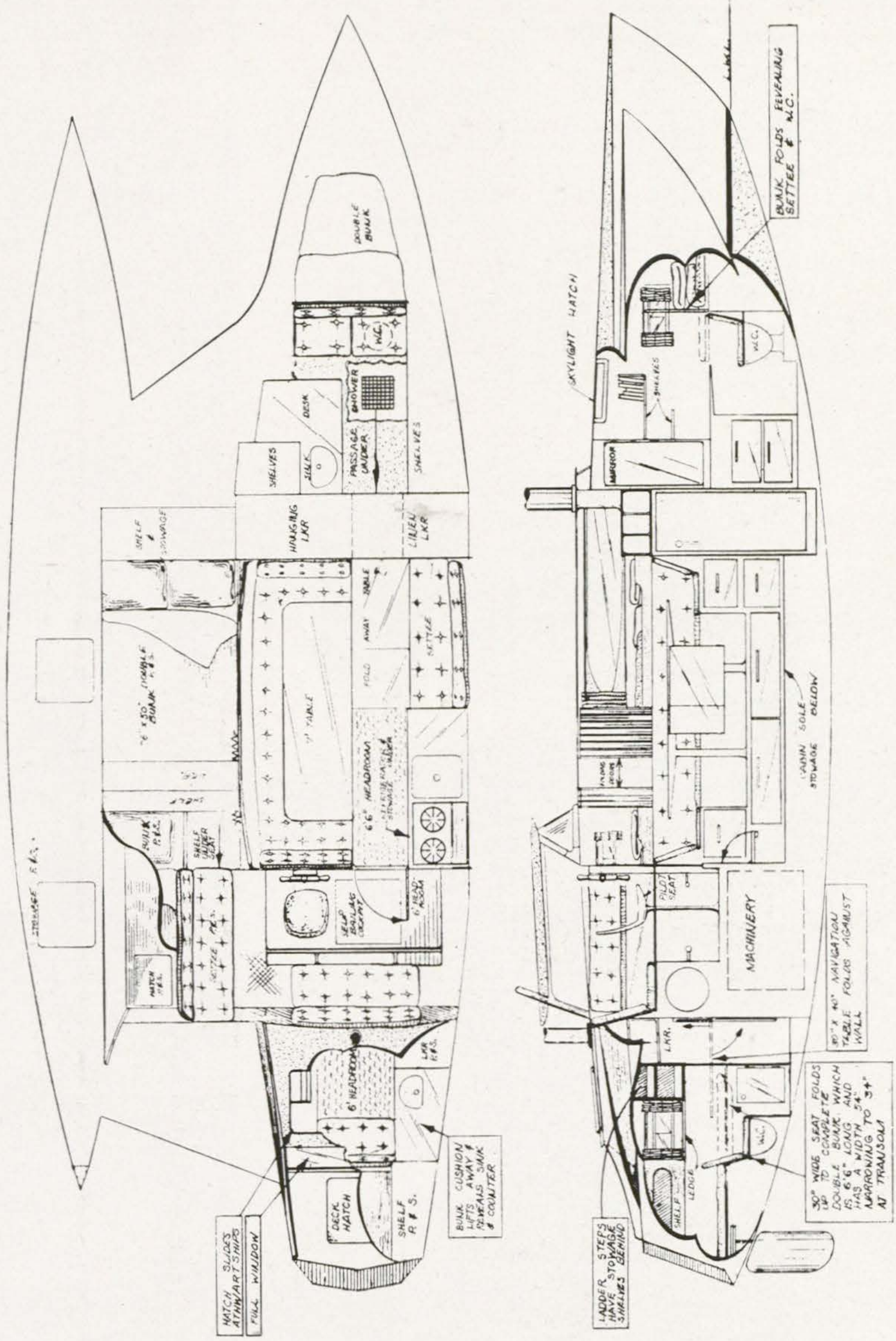


Fig. 7. Piver 40 Wheelhouse Type.

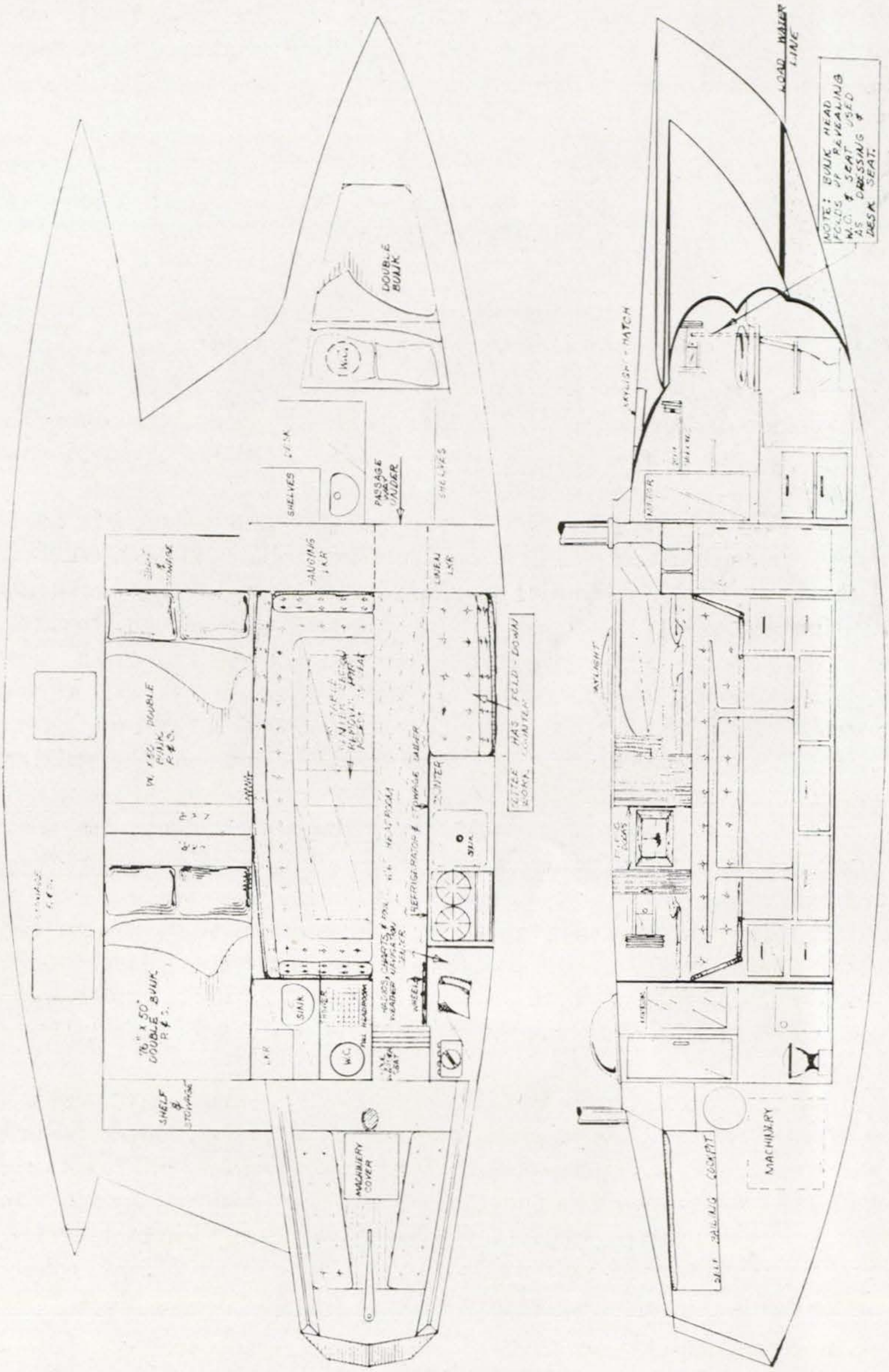


Fig. 8. *Piver* 40 *Aft Cockpit.*

designs, the underwater surface is reduced by a chine at the L.W.L. or by curvature. This is not as marked as with the Newick, McLean or Macouilliard floats but it is a difficult point to decide how much speed to sacrifice for seakindliness.

THE NEW APPROACH

Stability and Seaworthiness Achieved by Different Means in Latest Type Craft

BY

Reg Miller

Physicist. Research Director, Pi-Craft

One may be bemused by the knowledge that certain desirable characteristics of sail boats have long been simply and economically obtainable but it is only in the past several years that this potential has been fully understood and developed.

We refer to stability and seaworthiness. The former has traditionally been achieved by a hull form to which ballast has been essential —the latter mostly by building so massive a structure the occupants are shielded against the onslaughts of the sea by a veritable fortress.

With ocean-going trimarans designed by Arthur Piver now appearing in impressive number (14 of them visiting Hawaii at one time in mid-1964) it is becoming apparent that their lack of ballast and ultra-light construction is no appreciable handicap to stability and seaworthiness.

Why is this so? The reason for the stability may be more apparent than the obvious seaworthiness. Let us examine these factors.

Primary stability of a multihull is a function of its weight and beam. Even with light construction the generous beam (made possible in the trimaran by addition of the floats) results in considerable restoring torques—rendering the trimaran the most stable configuration yet devised.

An interesting fact is that in a well-designed trimaran the righting moment does NOT decrease to zero when the craft is sharply heeled. Examination of the accompanying diagram reveals how high placement of float buoyancy centres will right the craft—even with mast horizontal.

A Piver trimaran in Australia has passed the 90-degree heeling test required for Junior Offshore Group participation. A weight equivalent to the working sails is hung at the jib halliard block.

Seaworthiness another matter

Seaworthiness is another matter. The fact that no structural damage has been reported (even though so many ocean crossings have

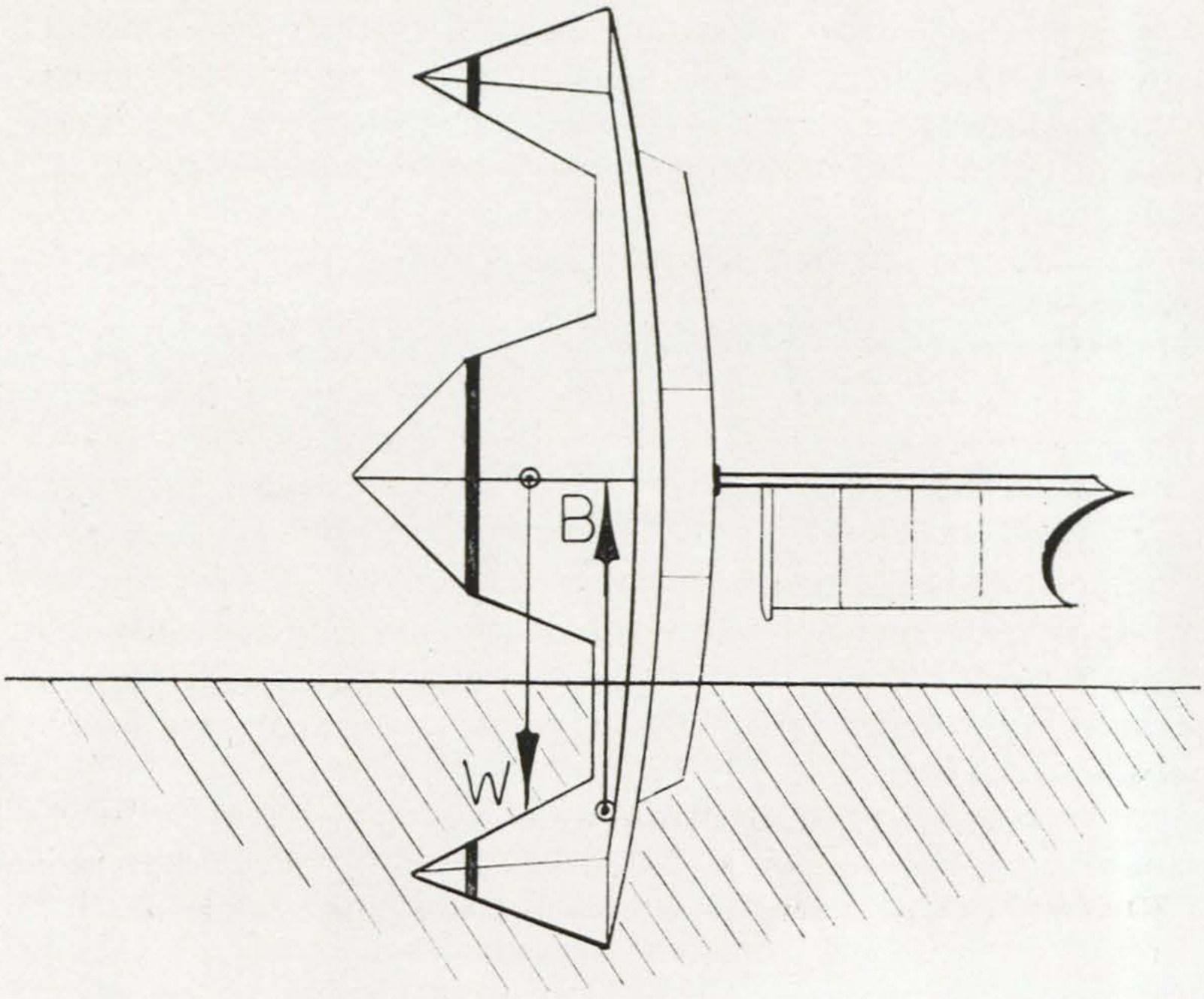


Fig. 1.

already been made by these particular trimarans that count has been lost) is related to the most basic reasons for sudden stressing—which is *Impulse.*

This is an interesting concept in physics. It stems from the forces involved when two bodies (such as a wave and a boat) collide for short durations of time. Mathematically:

$$\int_{t_1}^{t_2} \vec{F}\,dt = m\vec{V}'_c - m\vec{V}_c$$

$\vec{F}$ = resultant external force
dt = small time duration of $\vec{F}$
$m\vec{V}'_c$ = final momentum
$m\vec{V}_c$ = initial momentum

Fig. 2.

The present discussion relates to the intriguing consequences of the above equation.

First for a basic understanding of Impulse. Momentum is the product of the mass (M) of a body and its velocity (V). Thus a body with a mass of 6 grams and velocity of 20 cm. per sec. has a momentum of 120 g. cm./sec. Suppose an impulse force acts on this body and slows it down to 5 c.m./sec. The difference of momentum is 120-30

or 90 g. c.m./sec. The interesting thing is this : if this change of momentum took place in 1 sec. the impulse force would be 90 grams. If it took place in 1/1000 of a sec. the impulse force would be 90,000 grams. And if the change took place instantaneously (which of course is impossible) the impulse force would be infinite ! We can see why stopping things *quickly* requires *some* force and powerful structures.

Many of use are familiar with the experience of finding a tree branch which is too strong to break over the knee. The simple solution is to support one end on the ground and the other on a rock and jump on the centre. Crack ! It breaks even though our weight *alone* would not break it. This is due to the extra impulse force brought into play by quick impact.

Also—if the branch is dry and brittle, it breaks more easily than would a flexible green limb. The reason is that the duration of impact is much longer and hence impulse force much less for the green branch.

A striking practical use of enormous impulsive forces is the engraving of solid granite by air blast (100 lb. in.^{2}) with fine particles ($\neq 30$ carborundum), sculpturing sharp forms as shown in the sketch.

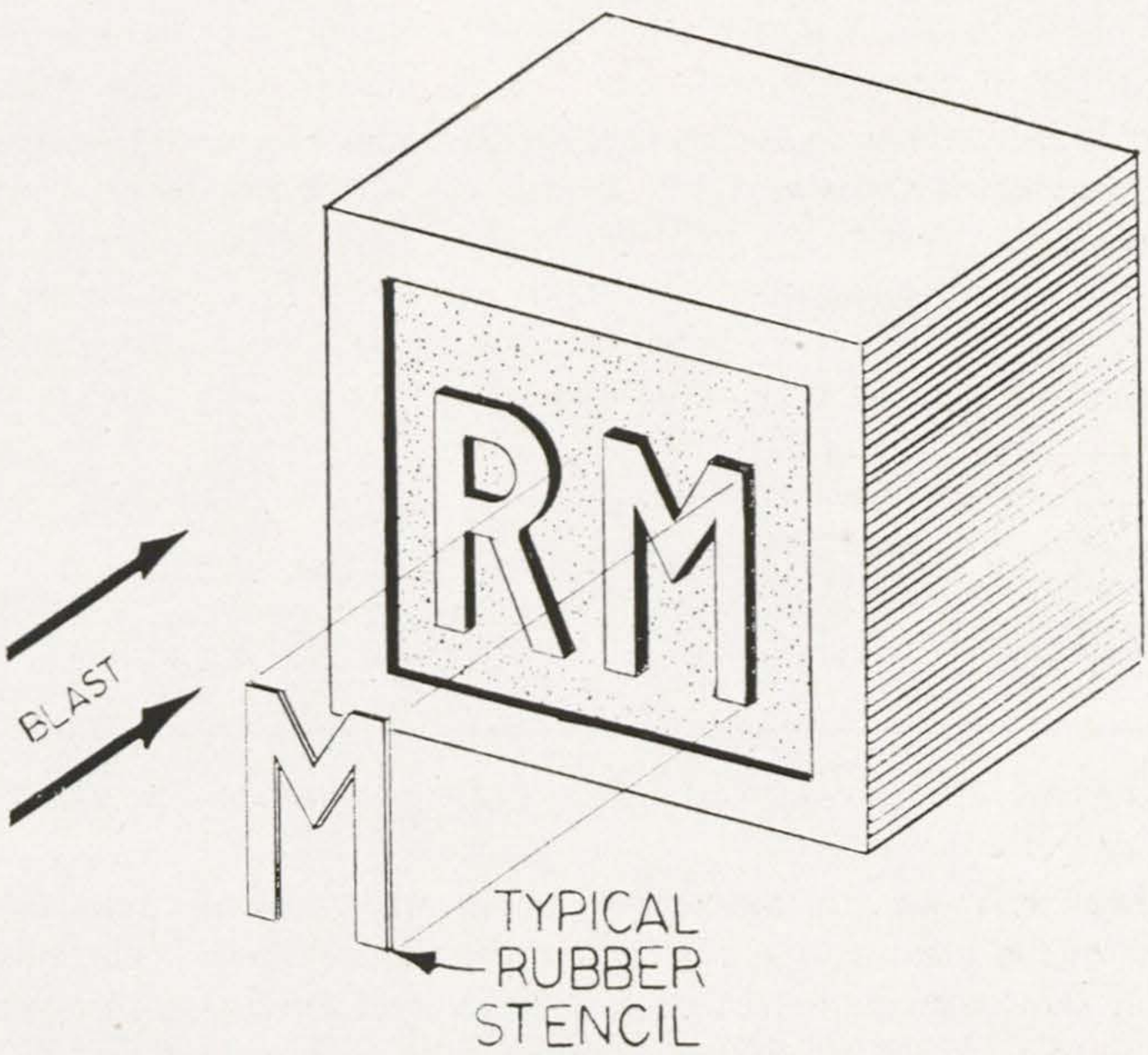


Fig. 3.

The sharp letters are not carved by a narrow stream but by first gluing rubber stencils 1/16 in. thick to the surface of the granite.

These places represent the areas *not* to be carved. The entire surface is then blasted at once. The granite and the carborundum are very inelastic and the time to slow down the carborundum is so very short that enormous impulsive forces are generated—sufficiently large to gouge the granite 3/16 in. deep within several minutes!

The rubber stencils, however, afford a relatively long time for the carborundum to slow down (even though only 1/16 in. thick) and thus the impulsive forces developed on the rubber are so small there is little sign of abrasive action.

Respect for Impulse

We should by now have developed a respect for Impulse. It is also clear why ballasted boats must be constructed with heavy planking and framing (in addition to merely containing the massive dead weight of the keel itself). By their very nature they are relatively immoveable when slammed by a wave. Like the brittle branch the craft yields but slightly, with the result that forces developed by Impulse are considerable.

This may also explain why deck structures are traditionally the weakest part of such a design. They are usually less ponderously built.

The trimaran with its aircraft-like construction, on the other hand, yields to such a blow—and as a result much smaller Impulse forces are generated. The fact that the triple-hullers we are discussing have very shallow draught (no boards are fitted on Piver cruising trimarans) makes it that much simpler for them to easily move sideways if struck by a sea upon the beam.

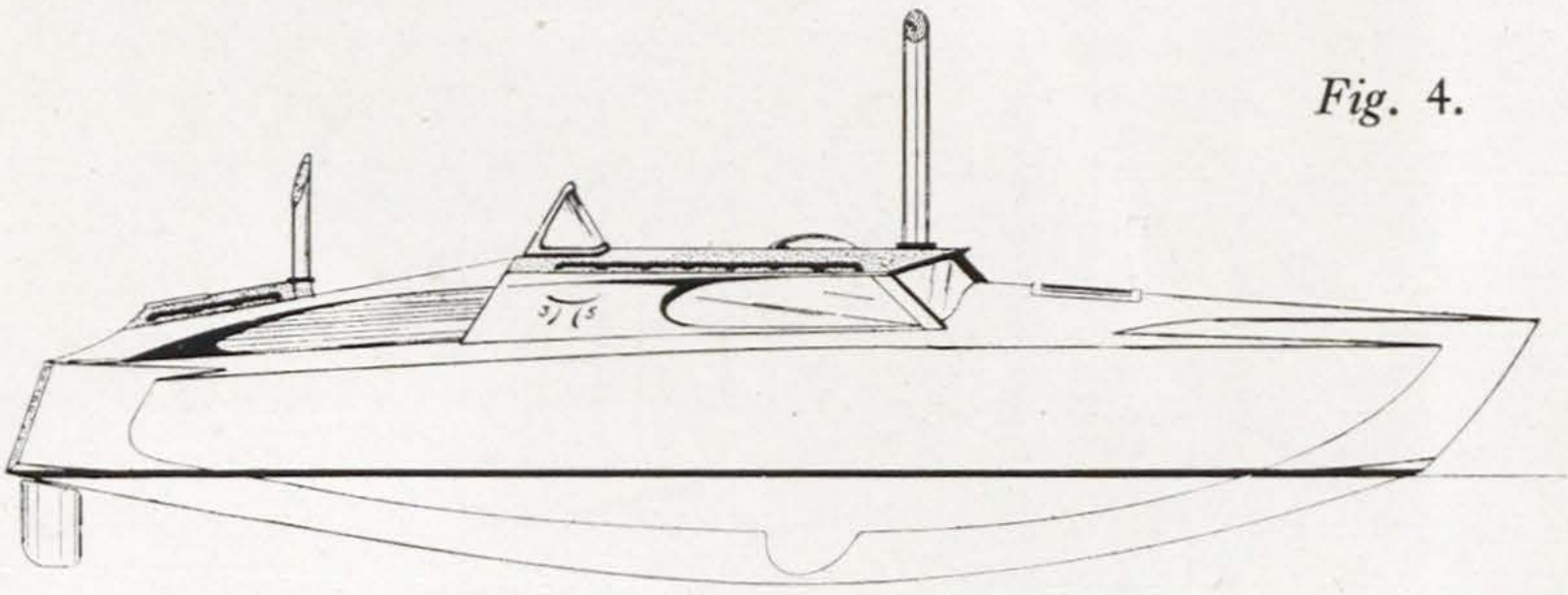


Fig. 4.

Thus we begin to understand why a stress engineer can design a craft much lighter and yet safer than traditional types. The accompanying sketch of a modern trimaran shows such a craft—with welcome window areas which would be ridicuously large for a ballasted boat—but practicable in such a multihull.

HIGH-SPEED OCEAN TOWING

BY

ARTHUR PIVER

A unique way in which to get a sailboat across an ocean in the minimum time (and at minimum expense) has been illustrated by a U.S. Destroyer and a 35 ft. *Lodestar* Class trimaran.

The sailboat, owned by Ed Riddell of Carmel Valley, California was en route to Hawaii from home.

First part of the trip was uneventful except for some good surfing when the Piver-designed trimaran hit speeds of over 20 knots.

Failure of foredeck casting caused loss of the mainmast at night. Seas were so rough it proved impossible to get the spar back aboard and it was cut adrift.

A jury rig was fitted the next day by the use of the mizzen mast, and the boat was sailing back to San Diego when the Destroyer sighted her and offered tow. One element which offered difficulty was the fact that the trimaran had lost her rudder, and was having little luck with a temporary arrangement.

Using 250-300 feet of one-half-inch Nylon line, the multihull was towed some 400 miles to port at a speed of 15 knots.

Riddell reported: "We had no difficulty except that the trimaran would occasionally surf on a following sea—going so much faster than the Destroyer we would run well over the line—and when the strain was again taken up the line would stretch like a huge rubber band—we would shoot ahead in an incredible manner. This was so hard on the nerves we could not sleep. We later dragged various objects astern so we could no longer surf. There is apparently no limit to the speed with which these particular craft can be towed. The only effect on our boat was the wearing away of paint on the foredeck when the tow line would be dragging far astern."

One factor which makes the above episode even more remarkable was the absence of a rudder on the trimaran. When the mast had first been lost the boat was hove-to under just mizzen, and as these boats can make considerable stern-way under such conditions, the rudder had broken when a home-made gudgeon snapped. Usual procedure when heaving-to is to lash the tiller so the rudder is just past the centre position. Riddell had forgotten this, and the strain on a hard-over rudder while going astern had proven too much.

The feelings of those on board when the trimaran would wildly surf and overtake the Destroyer can well be imagined—it would have been bad enough if they had been able to steer—the successful tow is a tribute to the trimaran's directional stability.

As bulky trimarans when shipped in the usual manner are subject to particularly high ocean freight rates (which are charged on a cubic-foot measurement basis), Riddell's experience shows a new way for these boats to either be transported or for sailors to quickly cross stretches of water they do not want to actually sail. Such procedure would be impossible with ordinary boats—whose hull form limits them to much slower paces.

Riddell has suggested that the towline be fitted with a swivel and and a quick-release attachment.

Dear Sir,

Thanks for your lines which I found two days ago, coming back from our 3 weeks' cruise on a *Nimble*. The craft has been well built by the Novo Shipyard in Murano (Venice) and the owner, my friend C. Biagi from Milan, has been able to equip it keeping the all round weight reasonably low. The engine is an outboard Johnson of 9.5 h.p., mounted inside through a well and retractable when sailing. I disagreed with Mr. Biagi about a change in the rig suggested and made by the shipyard in order to make the craft faster with the weaker winds predominating in the Mediterranean: the mast has been made 1.60 metres longer, the jib is smaller and half way between mast and bow, and a third sail—a big yankee—has been added forward. The craft has the usual two side fins under both floats. As I had forecasted, such a rig allows greater speed in some rare conditions yet the boat goes to windward less well and the handling is rather awkward and tiresome. With light breezes the boat sails much better with mainsail and Genoa.

The first thing which struck me was a strong luffing tendency, even under reefed mainsail and jib, especially at low speed. That involves an additional resistance due to the helm, and often makes the craft hard to control.

Fully equipped and with 5 persons aboard the craft reaches easily 5 knots under power, also with light winds. In favourable conditions, leeward of islands on sheltered waters and strong wind, we reached speeds of 12-14 knots either with the wind abeam or nearly close hauled. From Rovinji to Pula, under reefed mainsail and jib, we sailed with a violent Bora wind averaging 7 miles for three hours. I feel therefore sure that speeds of 20 knots can be obtained exceptionally, as already stated.

Pointing is reasonably good with light wind and sea, nearly 80 degrees in tacking, and decreases of course at higher speeds because of

the relative wind. The real danger is the big windage of the whole craft: coming about with wind and sea of force 2-3 is already a problem because as soon as the boat presents her nose to the wind, the speed drops to zero. We barely avoided a shipwreck tacking along a wide channel because the boat refused either to come about, or gybe or to turn backwards, and only an immediate use of the engine kept us from a bad end. Again tacking with strong wind on open sea, the boat regularly refused to come about so we had to gybe and loose enormously on each tack. I am sure that we aren't yet able to handle a new craft quite properly, yet the big windage and the lack of inertia peculiar of such a light boat do involve some dangers not to be undervalued. Under this respect I would indeed prefer a Micronesian with its slower yet absolutely safe way of coming about.

While sailing straight the craft behaves very well. Even with violent wind and angry seas she rode safely and gave us no anxiety of any kind. Under a gust, the windward float lifts. Then, in a few seconds, the inclination decreases, discharging itself in growing speed, a marvellous feel.

The inside accommodation is superbly roomy and comfortable, and the big deck area very pleasant. There is no doubt that, with this craft, Piver has come to an excellent configuration. The construction seems well balanced and strong. Also in a trimaran the underwing area is narrower and therefore less dangerous than in a catamaran. Personally, I would feel much safer using the *Nimble* on open oceans than in small seas where the ability to come about and to tack efficiently is essential.

Sailing in Jugoslavia is very beautiful and safe, there are hundreds of islands with coves and harbours, and one can always find sheltered waters in the lee of a land. We avoided cities. We used to sail during the day and drop anchor before evening in some desert cove in sight of a fishing village where we could find water and fresh fruit. People, mainly fishermen and peasants, are very kind and quiet. I took several notes and sketches; now I hope they will develop into new paintings.

I hope to know soon more about your ideas for a single hulled boat with hydrofoil stabilizers and squaresails, maybe you'll write something for the next publication.

Yours sincerely,

MANLIO GUBERTI HELFRICH.

Manlio Guberti, Péschici (Foggia)—Italia.
Gargano.

A *NUGGET* CAPSIZE AFTER BEING DISMASTED

Dear Mr. Dibb,

Thank you for your letter. I haven't read any newspaper reports and don't know how exaggerated they are. Anyway, here's what happened.

We sailed at midnight from Salcombe, South Devon for Tregier, Brittany. The Roches Douvre lighthouse passed to port about 10 a.m. With the wind building up, the spray flying across and the rain lashing down, it was exhilarating to watch it all through the large windows. Land soon appeared ahead. When about a mile offshore, we were hit by a sudden squall, one of the diamond stays came loose, the mast snapped and away went the whole lot into the sea. I was left looking at a bare deck feeling rather bewildered. We waved and shouted to a passing fishing vessel and then to the shore with no success. Realising we were drifting fast with a 3-knot tide towards the rocks by Les Heux lighthouse, we couldn't rely on help. We tried paddling while the anchor could be felt bouncing along the rocky bottom. Finally, with little time to spare, we made a jury rig with half the mast. We could no longer sail close hauled, the only direction she would sail was back to England, so back to England we sailed. Shortly after getting under way, we heard a belated gale warning.

The trimaran was a Piver design, the *Nugget* and the only modification was that I built the cabin longer, back to the crossbeam. We crossed the channel during the night and approached Salcombe in a S.W. wind of about force 6. I saw the waves breaking on the bar as the Pilot said they would at low tide. Near the cliffs where it was sheltered a little, it wasn't so bad. We'd had a rough night and thought we'd chance it. When we got to the bar, the wind dropped completely, being sheltered more than I would have thought by the cliffs and we drifted out.

Where we were seemed O.K. still. I looked round and a huge wave reared up astern. Probably, we would be O.K. if she could be kept from broaching, I thought. A split second later, I was engulfed by the sea. I felt her broach but couldn't control it. She tipped. I lost my bearings; then found myself underneath the boat. The chap in the cabin kept his head and made his way out. The other chap under the wing took longer and kept hitting his head on the deck. There were no casualties except a small cut on a finger (we later overheard in a bar that one of us had a big gash in the hand). All we needed was another sea to turn us upright again.

The lifeboat towed her in upside down by the mainsheet which

says a lot for "Arlon". The lifeboat men said it was taking a hell of a strain at each rise and fall of the steep waves. It was attached to an eyebolt, the blocks having broken.

We lifted her by a derrick on the quay onto one float and let her fall. The lifted float did not crash onto the water from such a height, the centre hull hitting the water first, cushioning it considerably.

The damage done was that the wing deck which swung over was smashed. Naturally, the mast, rigging and the fittings went with it. Coachroof beams were broken. The $\frac{1}{4}$ in. thick perspex windows were undamaged and the construction is still sound.

Because the repairs, a new outboard and new equipment which I would have to get would cost me so much, I gave the boat to one of the lifeboatmen for a nominal sum. I may have been too impetuous in doing this, but it's too late anyway.

I have done a fair amount of cruising in 8-10 ton Bermudian sloops and my trimaran compared very favourably. The only big disadvantage I found was that she was usually impossible to manoeuvre in confined waters. She would have needed a fairly powerful outboard in a strong wind because she was so light in the water. Anything below force 2-3, I could paddle her, quite fast with no wind.

In the open sea, she was ideal, comfortable, light and airy instead of the dark depths of a conventional yacht. We didn't get seasick so easily. She was extremely fast. Several times, I have surfed while running, reaching fantastic speeds. Once with the wind on my port quarter, I caught up with a fast moving cargo ship. The wind increased more and the starboard float kept digging into the waves so I had to reef in.

She wasn't so good to windward but I think she was at least as good as the 8 and 9 tonners. I sailed across the English Channel from Poole to Guernsey and back with some very dirty variable winds in a weekend.

With the great advantages of a well designed trimaran, I can't understand why its popularity hasn't spread like wildfire. I expect there will always be a large number of people who will prefer a solidly built yacht, though.

If you're ever short of a crew for your trimaran, I'd jump at the chance to sail with you. The best of luck with your design but I think you'll have a job to improve on Piver's, if that's the object of the exercise.

D. PEACOCK.

R.A.F. Melksham, Wilts.

Editor: We publish this letter to show that a trimaran *cannot take quite everything that comes.*

Dear Sir,

I enclose a short commentary on T20 sailing qualities as requested. Owen Dumpelton asked me to also enclose the original drawing of steering gear.

My first impression on stepping aboard *Humming Bird* after her launching last May, was one of stability and space. The wide side decks (wings) gave a big ship feeling when going forward to hoist sail or anchor. My first sail was single handed and I was impressed by the general manoeuverability in getting away from the somewhat congested moorings.

In several short tacking matches I have had with larger keel boats, I easily pointed as high and was soon ahead, usually after three

T20, Owen Dumpleton.

tacks. The excellent windward ability is due, in my opinion, to the general low build combined with well rounded cabin and float deck contours.

Off the wind the speed is very satisfying with virtually no spray in the cockpit even in rough going.

Humming Bird carries the standard main and working jib plus a small jib for heavy weather. There is also an optional Genoa and storm trysail which I hope to acquire in the future. The sailmakers did a good job. The main has the lower full length battens eliminated, although still retaining the belly or shelf along the foot. I have found

this works very well with the roller reefing as I have a nice amount of fullness which progressively flattens as I reef in.

The boat is well canvassed for its size so the light air performance is good. It pays to reef down above force 4. A useful indication when this is necessary is given when the lee float tip begins to be driven under, this being conveniently visible from the steering position when sitting to windward, through the cabin companion way and side windows.

In strong winds she sails well to windward under small jib alone, but for perfect balance this may be set in the storm trysail position, the luff running from an eyebolt aft of the samson post to a point 12 ft. up the mast. As an experiment I sailed with a G.P. 14 jib set in this position, and found that even in light airs the manoeuverability was amazing.

When sailing single handed and having any foredeck work to do, the procedure I adopt is to free off the main until it weather cocks, haul the jib to weather until she balances. Reefing the main or changing headsails is then straight forward with the boat gilling along at two knots or so.

Points of Interest

The floats are almost filled with slabs of expanded polystyrene, and as an added precaution may be pumped out from the cockpit through built in plumbing.

The drop plates of 3/16 in. mild steel are let into recesses from the outboard face of each float. They are normally retracted when sailing in light airs, but in stronger winds a bit of plate down helps to balance the helm. I think fixed skegs would do the job, but retractable plates have other advantages such as ability to lift clear of mooring warps etc. Also they have the invaluable advantage for levelling up the boat on a slope when taking the ground.

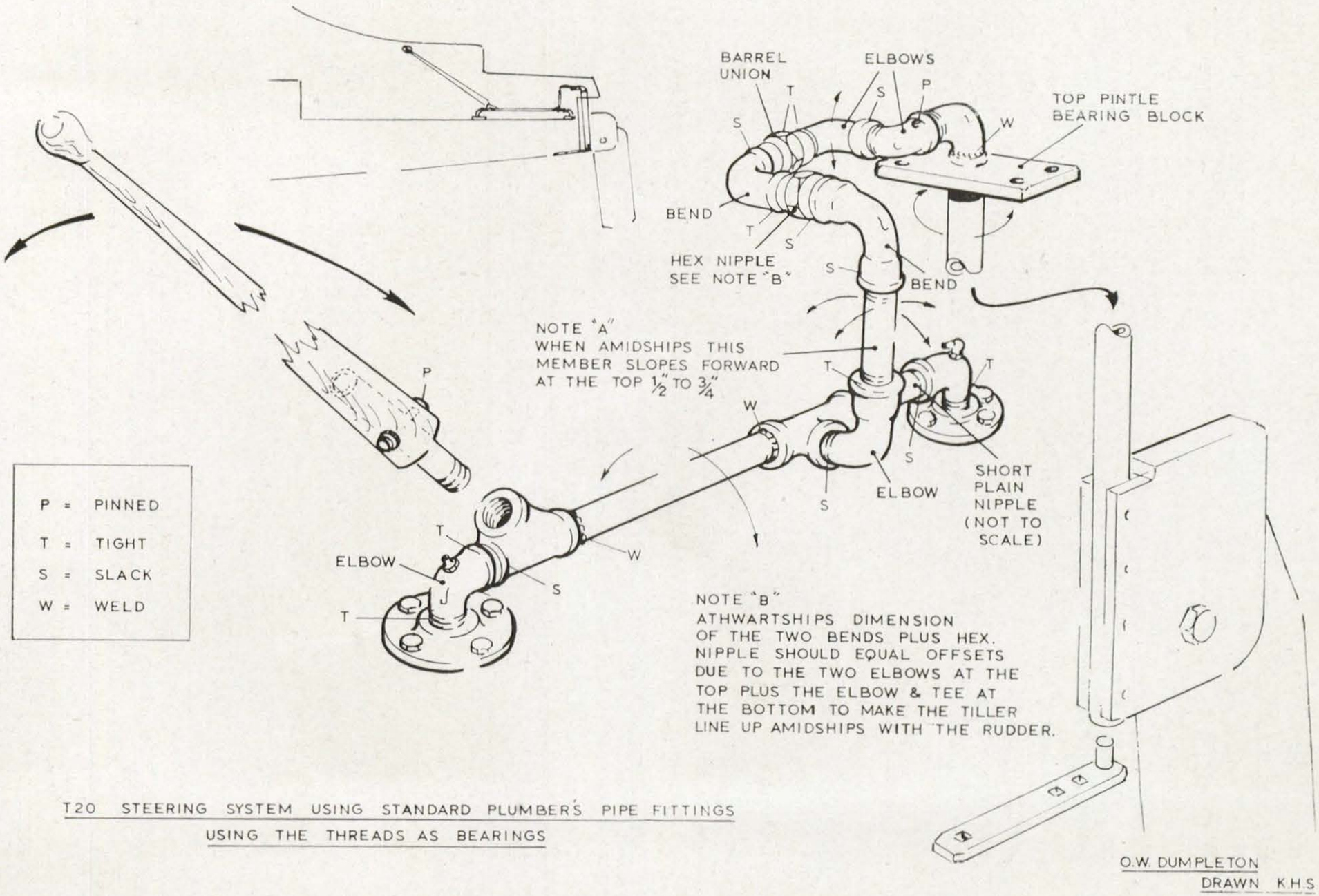
There is only one way to test a boat and that is to sail and sail, taking what comes. This season I am doing just that and at the same time checking up on the gear and equipment. Next season she should be nicely tuned for racing.

Yours sincerely,

5 Broom Leys, St. Albans, Herts. K. H. SIDES.

THE PLUMBER'S NIGHTMARE
OR
THE T 20 STEERING SYSTEM

We have many ingenious A.Y.R.S. members who make catamarans from welded oil drums, aeroplane drop tanks and gadgets from bits and pieces they find lying around. But for sheet ingenuity, I



T20 STEERING SYSTEM USING STANDARD PLUMBER'S PIPE FITTINGS
USING THE THREADS AS BEARINGS

O.W. DUMPLETON
DRAWN K.H.S

have never seen anything to beat the steering system used on the T 20 trimarans.

When Owen Dumpleton first showed me the "Whipstaff" tiller aboard his T 18 and told me that it was made from plumber's fittings, I did not take very much note of it. It seemed to work well and give a nice positive action. However, when Ken Sides sent me the drawing shown, I must say that I was dumbfounded by the complexity and sheer genius of it.

The mechanism works because I have used it but, study the drawing as I may, I cannot see how. Indeed, as I have a strong respect for my sanity, I have now given up even trying to work this out.

I take off my hat to Owen Dumpleton for devising the most ingenious mechanism I have ever seen in my life.

Dear Sir,

I am taking the opportunity to forward to the Society a draft copy showing the general form and construction of a 2-3 berth cruising trimaran. I believe the Society pioneered the development of this type of craft and I would be grateful if you could pass some helpful, ethical comments, especially on the theory of trimarans.

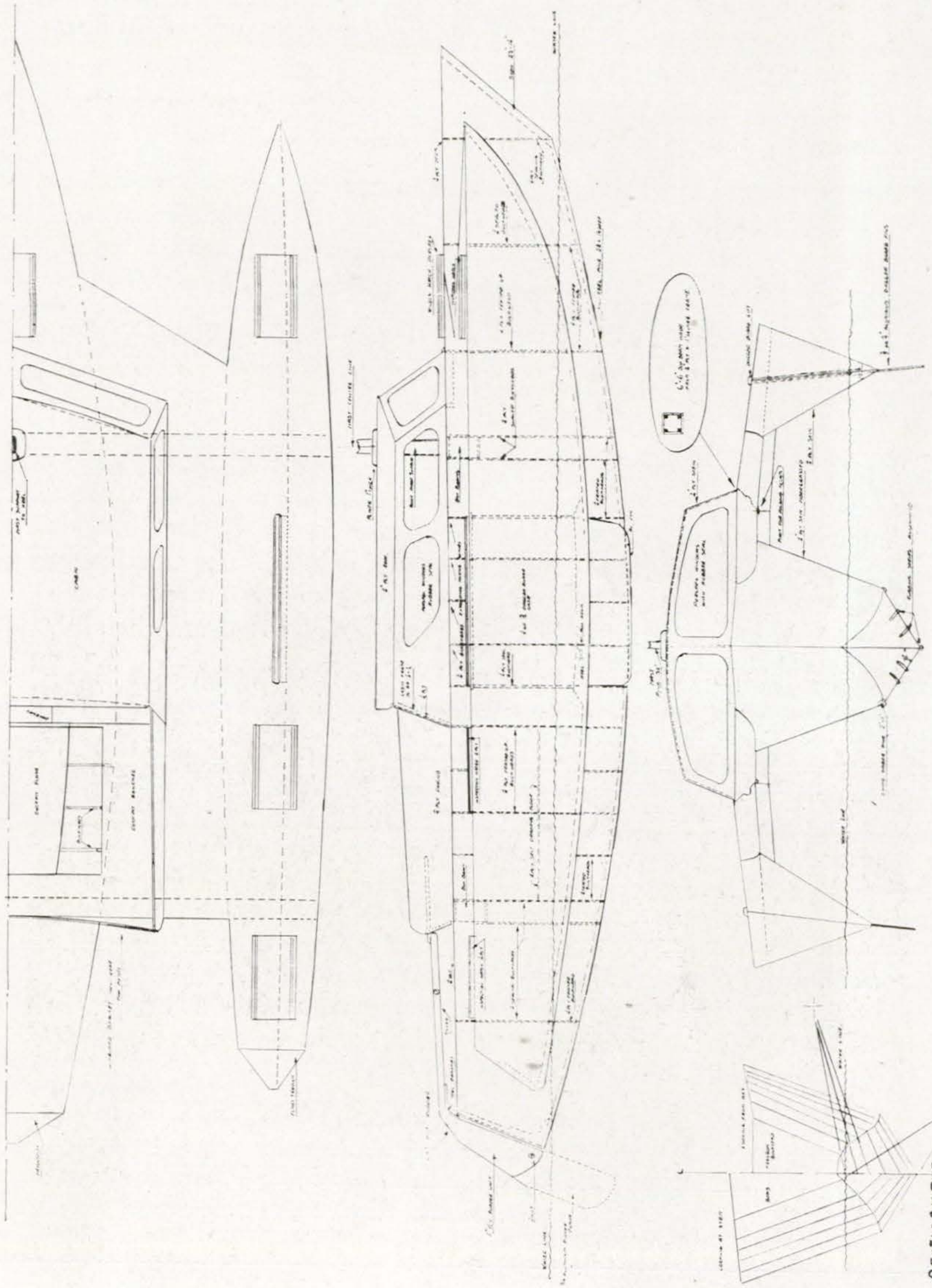
Briefly, what I am looking for is:—

a) A load carrying capacity of 1,000 lbs.
b) Trailable with 8 ft. beam on the trailer.
c) Cruising ability in the English Channel with 2 adults and 2 children.
d) Easy construction for an amateur.

I decided to design a craft myself as the designs of these craft appear quite diverse. Therefore I attempted to choose a craft to suit our own requirements and I prefer the personal challenge. Considering that the timber will cost £150, it would be helpful to know whether you feel I would be wasting my time.

Having spent many hours studying plans of these craft, I consider I can do a good job, the drawing being a draft scheme. However, there are parts of which I am not absolutely confident about as follows:

1) Have I got enough bulkheads?
2) Is the 7 square feet of fin enough?
3) Is the rudder large enough.
4) Is the cabin high enough or too high?
5) Is the hull form satisfactory?



Trimaran Design, by D. J. Cousins.

I shall treat any comments in strict confidence, not wishing to hold the Society responsible for any later events. All I can offer at this stage is a guarantee to keep you fully informed of progress with the ultimate object of furthering the development and use of these craft by amateurs such as myself.

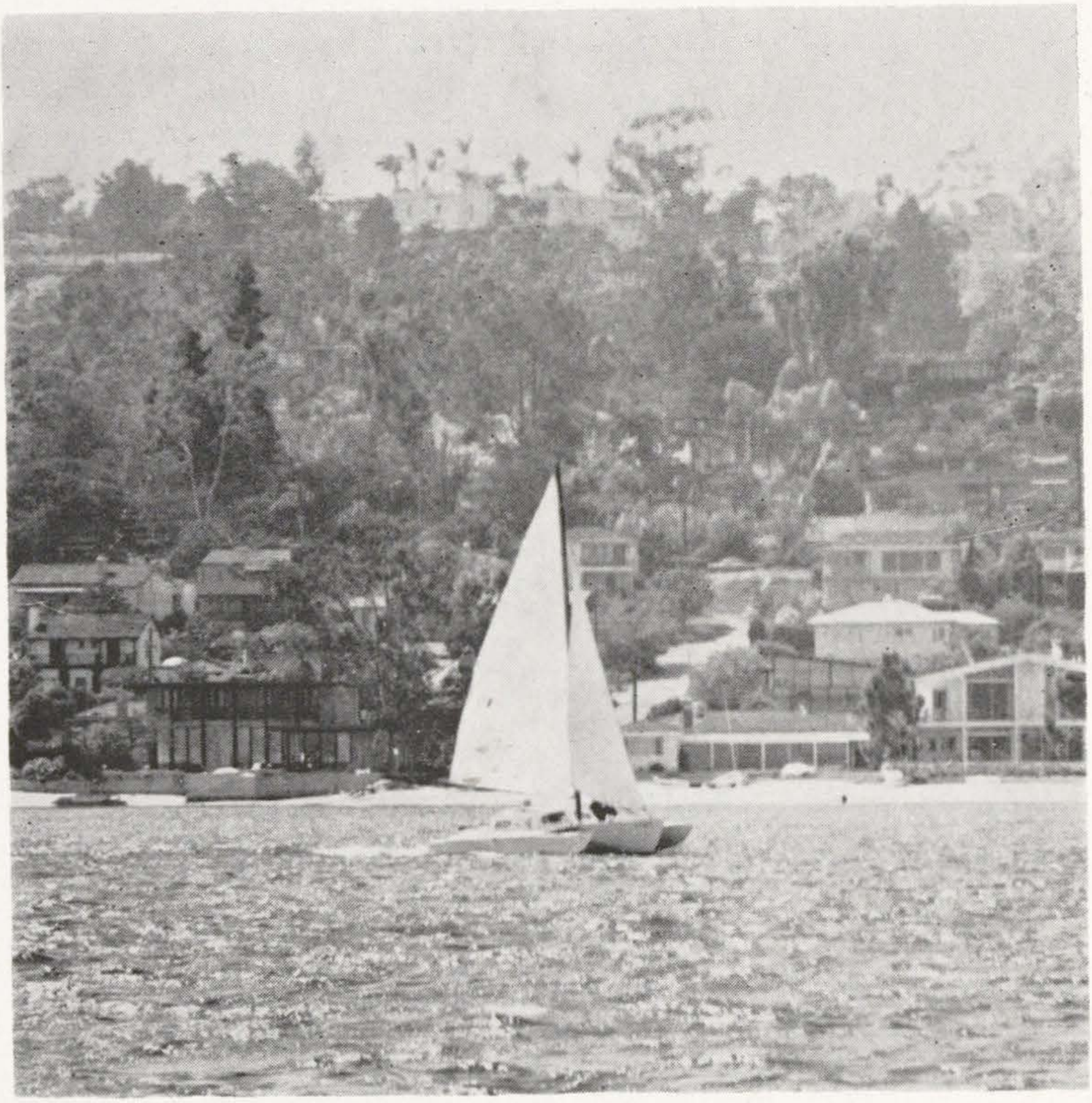
DONALD JOHN COUSINS.

"Kastanjes", Lyddons Mead, Chard, Somerset.

Ed. I think the hull is too fine aft and will tend to squat at speed. Otherwise the design looks very nice.

Dear Sir,

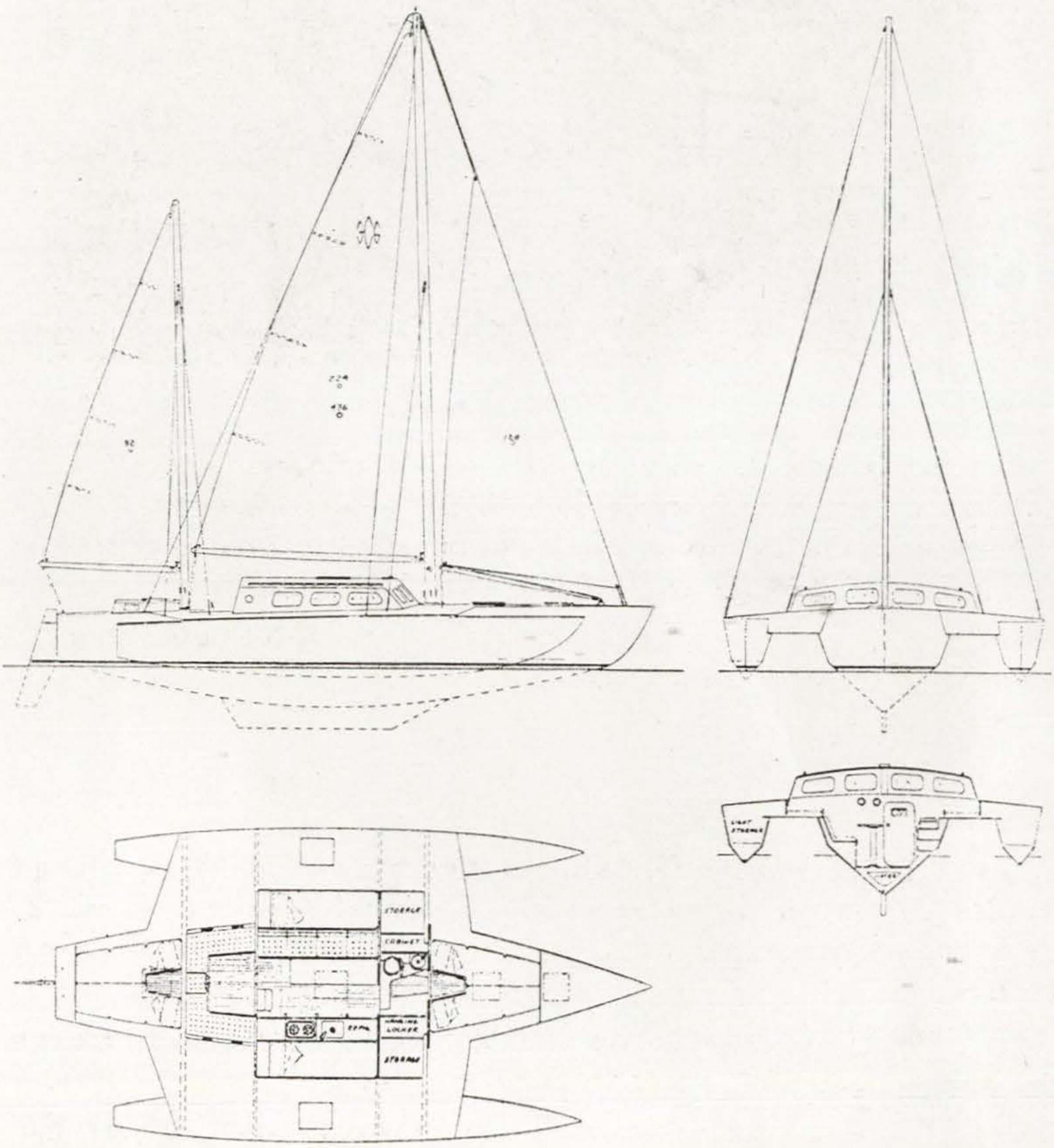
I am enclosing a picture of my 24 ft. trimaran, A.Y.R.S. No. 47, as I think it is interesting. It was taken last summer and the wind was blowing some 14-16 knots and the boat in a broad reach was



Cross 24 *doing* 12-13 *knots.*

registering 12-14 m.p.h. on the speedometer. The hump speed seems to be about 10 m.p.h. and over this speed everything feels different. The stern rises and then the boat levels out and it seems to ride on top of the water. The tiller has a light touch and you have to have the main trimmed right or it will come into the wind. It is very dry even in a slight chop. I usually like one person along to ride on the weather float to help balance the boat. You will notice how far back the wake extends.

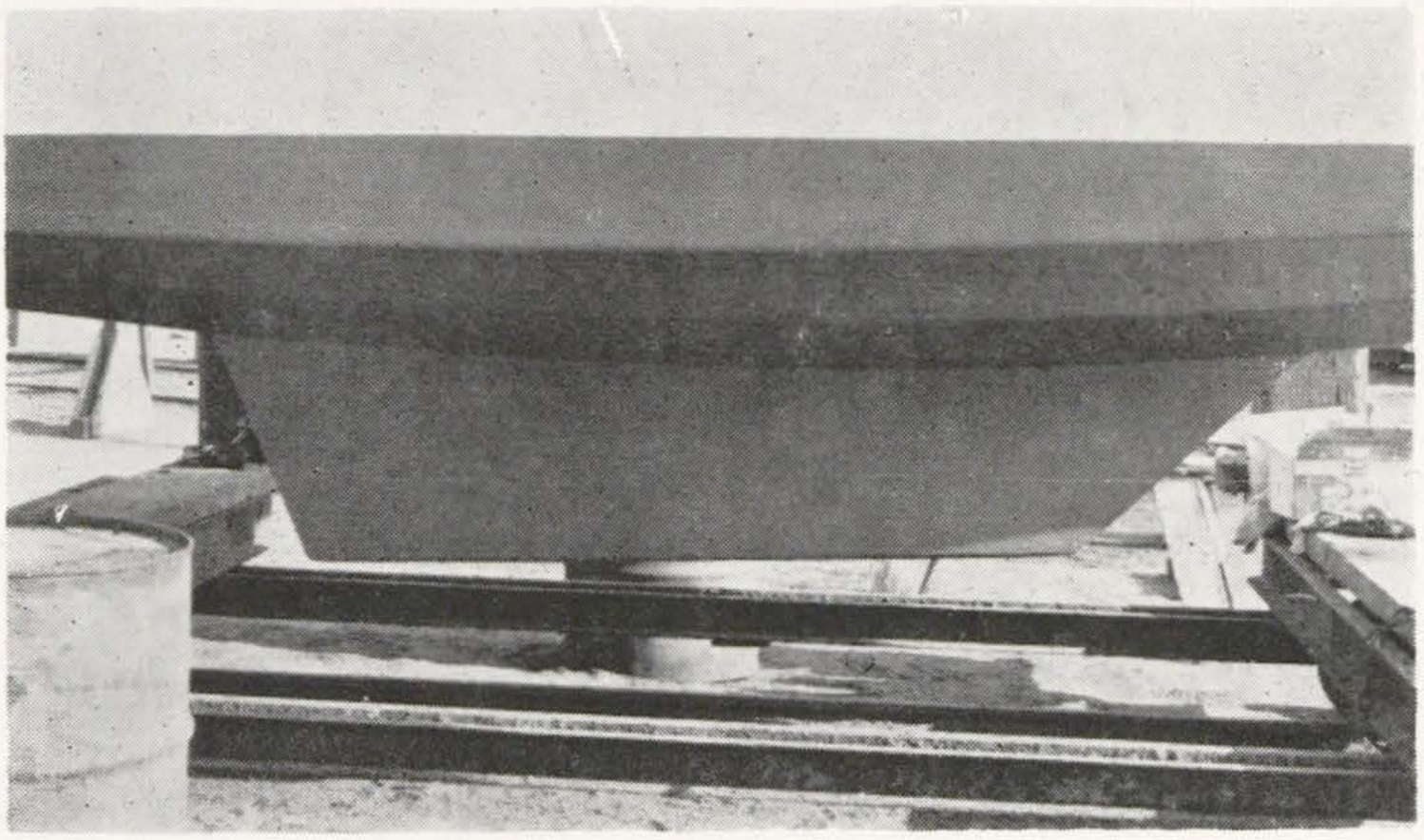
I have sailed my *Cross* 24 for 1½ years and am well satisfied with the under water section. On my last vacation this summer, I sailed my boat to Catalina Island and several ports up the coast. It was a wonderful trip. We met the *Nugget* trimaran on several occasions



Cross 36 *with fin on main hull.*

and sailed against them. There was no trouble in overtaking and going to windward of the ones we met, even though we were loaded for cruising.

Two 36 footers of my design are under construction and several 24's. Also, the *Cross* 30 should be started soon. The Blue Star Marine in the Toronto, Ontario, Canada area will be building my boats.



The Cross 24 Keel.

I also enclose the plans of the *Cross* 36 trimaran where I use a fin on the central hull which is different to most designs. It still only puts the draught up to 3 ft. 8 ins. but gives a better performance to windward. The sail area of the 36 is 500 square feet.

NORMAN CROSS.

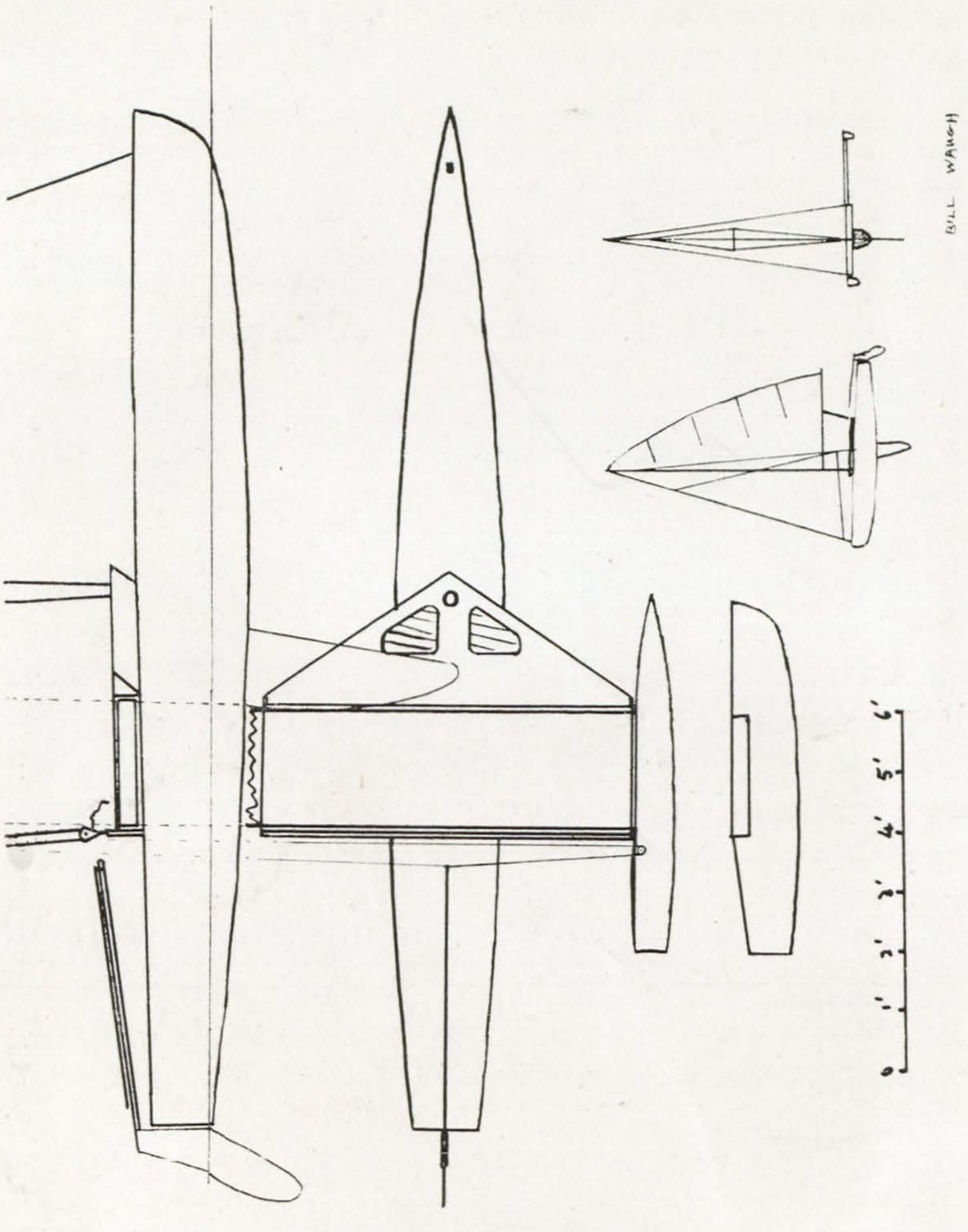
4326 Ashton, San Diego 10, California.

Dear Sir,

I note that the *Guardian* is sponsoring trials for an Olympic single handed dinghy (or catamaran etc.). Though I have not the money to partake in this myself, I enclose a few notes for the interest of your readers.

1) Olympic sailing has very much gone out of reach of ordinary people's pockets—the new boat must be cheap.

2) Top level sailing has tended to deteriorate into rulesmanship as opposed to seamanship—the new boat must be enough of a handful to make seamanship outweigh rulesmanship.



A racing trimaran, Bill Waugh.

3) The craft must respond to the skill it requires by being very fast and exciting to sail.

4) The craft must be strong enough to withstand the hardest sailing, but we may expect it to be handled with due care while ashore.

Notes on such a Craft. I enclose rough drawings of a single handed trimaran. The hull can be made out of sheet plywood in the form of a conic section. I have a cardboard model with an excellent

hull shape. Also the B Class *Mantua* employs the same form of construction.

The length overall is 17 feet and the total beam 12 feet. The outrigger floats (which are small since they are not expected to provide more than a basic minimum stability) are fitted to a sliding plank. This plank has about five feet of travel, being restrained by a wing deck attached to the hull. The plank is slid out to windward, producing a position of great leverage for the skipper. I would suggest a one design spar plan on which an unrestricted sail plan can be set.

BILL WAUGH.

203, Western Road, Leicester, England.

Dear Sir,

Allow me to present an ideal of a boat that, to my mind, would be fit to perform inshore cruising with an almost entire security.

To get this security, I designed it with good form stability, and obtain high buoyancy by employing lateral floats.

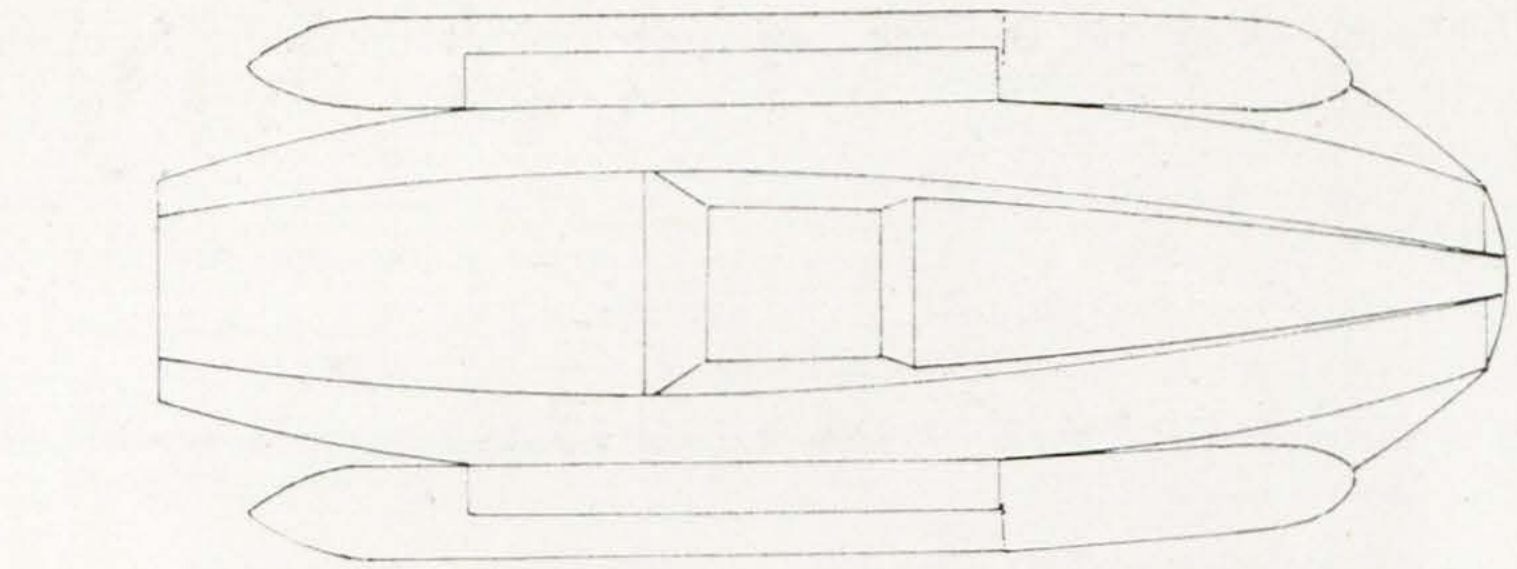
A boat that looks like a life-raft would never pretend to defy a racer, but I don't think she would be very slow. With wind on the side, her wetted surface would be reduced, and twin centreboards would allow her to sail close to the wind.

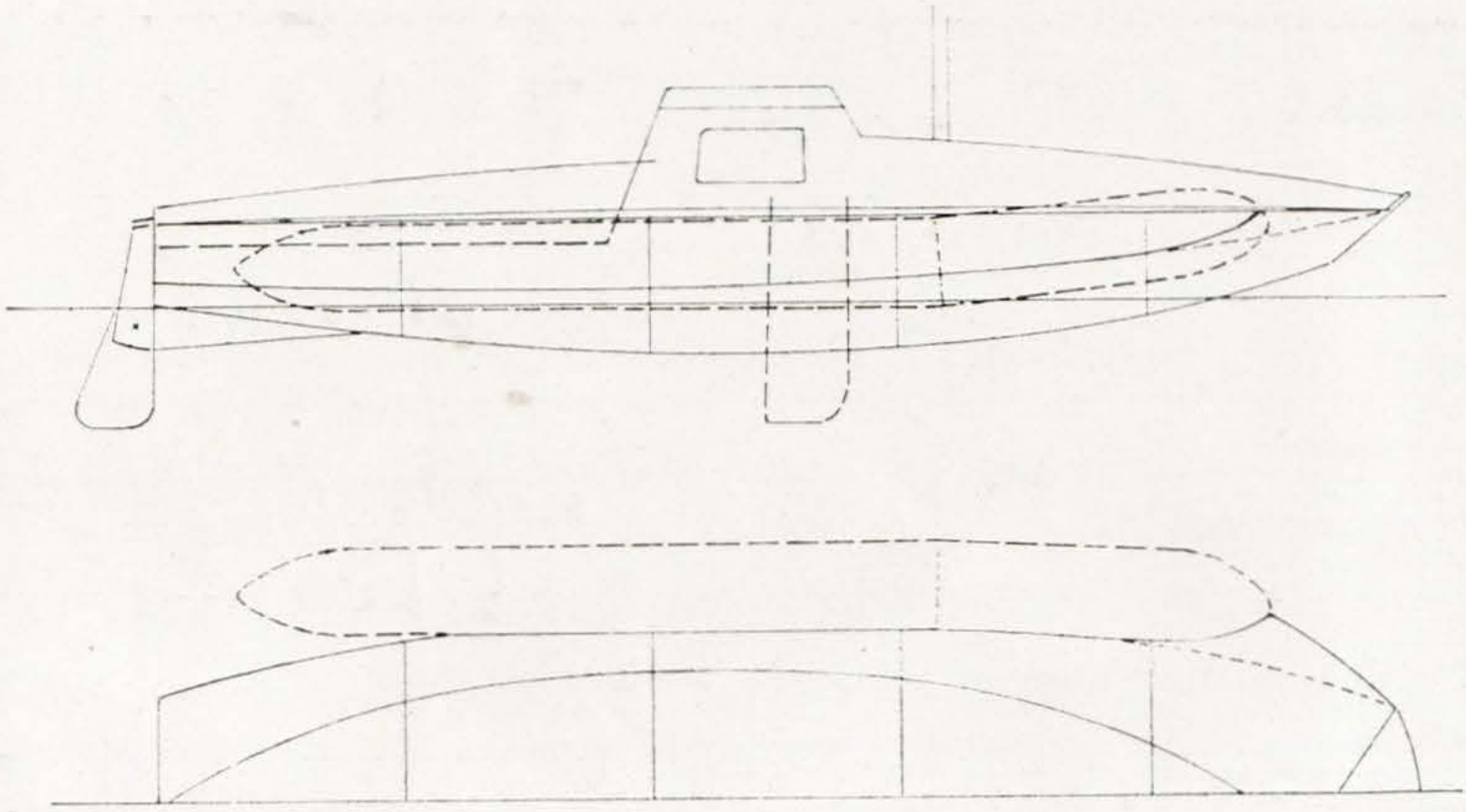
The superstructures are narrow, so as to clear the deck with easy fore and aft passages. The cabin, however, might give room to one or two berths, and the cockpit is large enough to camp in.

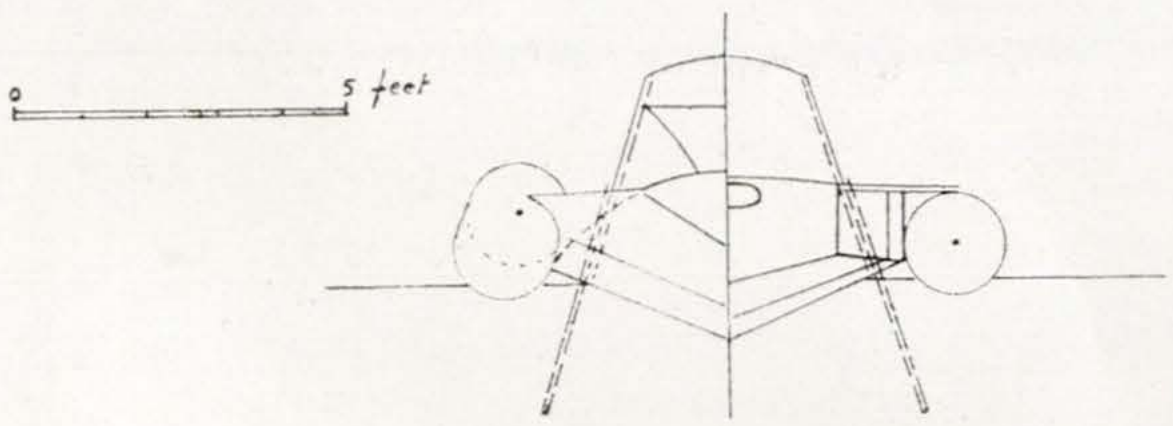
The stowage or a moderate ballast put in the middle of the boat, under the cabin, would increase the stability, already assured by the inflatable floats. The firm R.F.D. whom I asked, would be able to furnish neoprene floats at a moderate price.

This craft would easily be built in marine plywood, with no difficult wood work. The structure should be very strong, the framework of the roof being fastened on the hull through the deck. The mast, not too high, would have a main sail and a jib.

With her very little draught, that boat should be able to go anywhere and be driven easily on a beach. She would be very suitable, I think, for submarine diving amateurs.







L. O. A. 20'
L. W. L. 17'
Beam. 8'4"
Draft 10"

A small cruising yacht design, R. Clement.

I would be very glad to have your advice, If you think my idea should be suitable, I would like to collaborate with a fellow-member of the A.Y.R.S. so as to settle the matter.

Yours sincerely,

R. CLEMENT,

40, rue Eggericks, Bruxelles 15.

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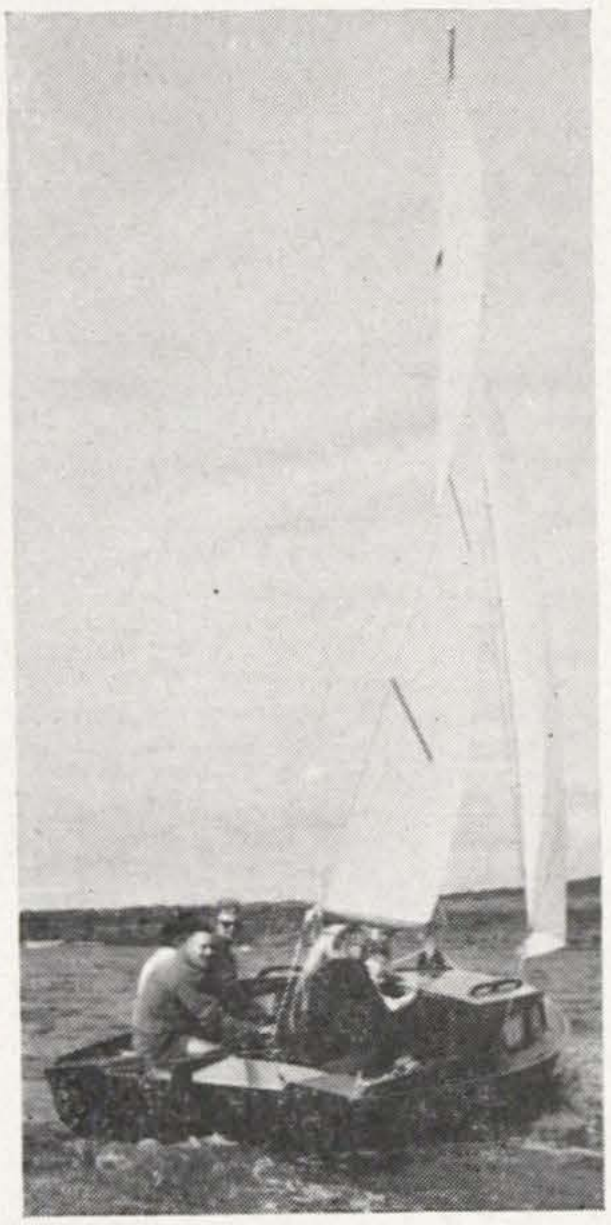

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