ROYAL LYMINGTON YACHT CLUB
1949 Lecture Season

AFTERTHOUGHTS ON MR. H. R. BARRETT'S LECTURE

It was good to listen to Mr, Bennett's lecture on the R.O.R.C. Rating Rule, and very clever of lan Carr to have persuaded him to come, for it often seemed to me that there is a conspiracy amongst the pundits to keep rating rules and time scales shrouded in mystery, while the mathematicians in the background, who are really responsible for framing them, are too modest to come forward and explain them.

If you want to familiarise yourself with the rating rule it is great fun to work out for yourselves the rating of the various types from the dimensions given in Lloyds Register and see how they compare. Don't be stumped if the Register does not give exactly the dimensions .you want. For "L" take the mean between L.O.A. and L.W.L. and in a yacht with long overhangs or anything abnormal in that way, punish her by adding a bit over. For "D" (Depth), well, you will have to guess at this from the draft given in the Register, and for "S", this is given you in the book, near enough anyway. Then it is best to have some square root tables.*

For "scantling" allowance, Mr. Gill tells me that for Lloyds class *"R," or a real racing job, give no scantling allowance or even a slight penalty; for Lloyds-class "A" or a fast cruiser type give one-tenth of a foot for every foot of rating; and for a heavy fisherman type give two-tenths for each foot of rating.

Now compare extreme types. Try (say) a thirty square metre and Mr. Wilkinson's Dutch barge Yacht "Seven Bells," You will get some surprising results. You will find, that given the right conditions "Seven Bells" may beat the 30 square metre.

Yes, it is just in this matter of getting the right conditions that the time scale breaks down, when you convert time on time (so many seconds per hour) to time on distance (so many seconds per mile). For time on distance immediately brings in the matter of speed, which is mainly dependent on the weather, and not on the design of the yacht. The difference of speeds between yachts of various sizes is greater in light weather than in hard.

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*For your ready reference the R.O.R.C. formula is :—

Measured Rating = $.15 \dfrac{L\sqrt{S}}{\sqrt{BD}} + .2\left(L + \sqrt{S}\right)$

Now a yacht is as capricious as a girl, but, like her human counterpart, does, if treated the right way, follow certain rules. One of these rules is very simple. For any given strength of wind the speed of a yacht varies as the square root of her rating, that is, of course, if the rating rule is a good one and gives a fair approximation of her water line length, when heeled. Mr. Barrett explained that there are certain limits at either end of the scale, so that you should not race very big yachts with very small ones.

In the expression: —

Corrected time = Elapsed time x $\dfrac{\sqrt{R}+2}{10}$ the business of adding 2 to the square root of the rating and dividing by 10, is simply a way of bringing in a scratch boat, or as Mr. Barrett called her, a "phantom ship," which is supposed to be a yacht of 64ft. rating *i.e.* the biggest that is likely to compete nowadays.

For, if you take the expression $\dfrac{\sqrt{R}+2}{10}$ and substitute 64 for R, you have, $\dfrac{\sqrt{64}+2}{10}$ = $\dfrac{8+2}{10}$ = 1, which is her time correction factor or T.C.F., and your 64 footer will have no time allowance.

Now, if you want to handicap by time on distance, you must think of some speed for your scratch boat, and then apply the square root scale to the yachts in the race. It is on the speed of the scratch boat that the differences of speed of the competitors depend.

What then is the speed of this scratch boat? And it is just here that the pundits become mysterious, for the very simple reason that they don't jolly well know, for, being dependent on the strength of the wind, it is a figure which is quite indeterminable.

The Y.B.A. adopt for their time on distance scale a speed, which is terrific. Our 64 footer is supposed to travel at about 12 knots, and search as you may through their rules and regulations, yon will not find any explanation for this.

In a very informative article, in the Yachting World in June, 1944, it is suggested that the maximum speed of a Yacht is 1.84 L.W.L. in knots, *i.e.* this is that critical speed, after which the power to drive her even a little faster increases by Very big leaps and bounds.

Substituting rating for L.W.L., we get from this a speed of 10.72 knots for our 64footer, a figure that is more reasonable. It may be that at the back of the minds of the pundits is the fact that, although adoption of a high speed for the scratch boat penalises the small boats, the actual shape of the square root curve favours them,[*] but the Y.R.A. legislate for this by modifying the square root curve at its lower end.

By using a time on distance scale, with a high-speed scratch boat, in any but the hardest weather (when the small boats cannot race at all) the smaller the boat the more she is penalised. Do away with time on distance, and adopt time on time, even for the shortest races, and you do away with all this speed business with its unknown quantities, and without a doubt get much fairer results.

But, if you suggest that this should be done, the protagonists of time on distance will tell you, that in a time allowance scale, you must have something simple, that you can work out in the cockpit, while you are racing, (as if you could not make a very fair approximation of your chances at any time during the race by the other method).

And finally as a crowning insult to you, fellow members, they will tell you that your brains are insufficient to grasp the time on time method, and the meaning of the time correction factor.

Why, the R.L.Y.C. as it was assembled together on the night of 25th October, fairly bulged with brains! !!

One other point Mr. Barrett pointed out that the time on time method involved a lot of arithmetic, when you come to work out the corrected times. I, myself, have simplified this considerably by reducing the elapsed time to minutes and decimals thereof, to two places only, which means that calculations are correct to the nearest 6 seconds, and, where results are not too close, I use a slide rule.

But:-

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[*]From the curve, Speed = $1.84\sqrt{L.W.L.}$ knots, the "Queen Mary" should be able to do about 41 knots, which is probably beyond the power of any engine you can put into her.

From the same formula compare also: —

S.S. "Strathmore"	640 feet	84 knots	(too high)
"Saluki"	82.5 feet	7.6 knots	(about right)
Model 2ft. long	2ft.	1.87 knots	(too low)

I would go further than this and say, that any yachts which, in a race lasting more than two hours, finish corrected time within 6 seconds of one another, should be dead-heated

To win by anything less than this in handicap racing is to win by a fluke, and a yacht only 4 or 5 seconds behind the winner on corrected time, deserves every bit as much credit as the winner.

Do, please/fellow members, back me up in this matter of time on time, if you feel you can. Though I always seem to be referring to them, I will gladly lend my Note Books for a few days at a time, to any member interested enough to wish to play about with figures and graphs. Any mathematically minded member used to handling the calculus, would get much further in this matter than I have been able to do.

H. *G.* BUSK.
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