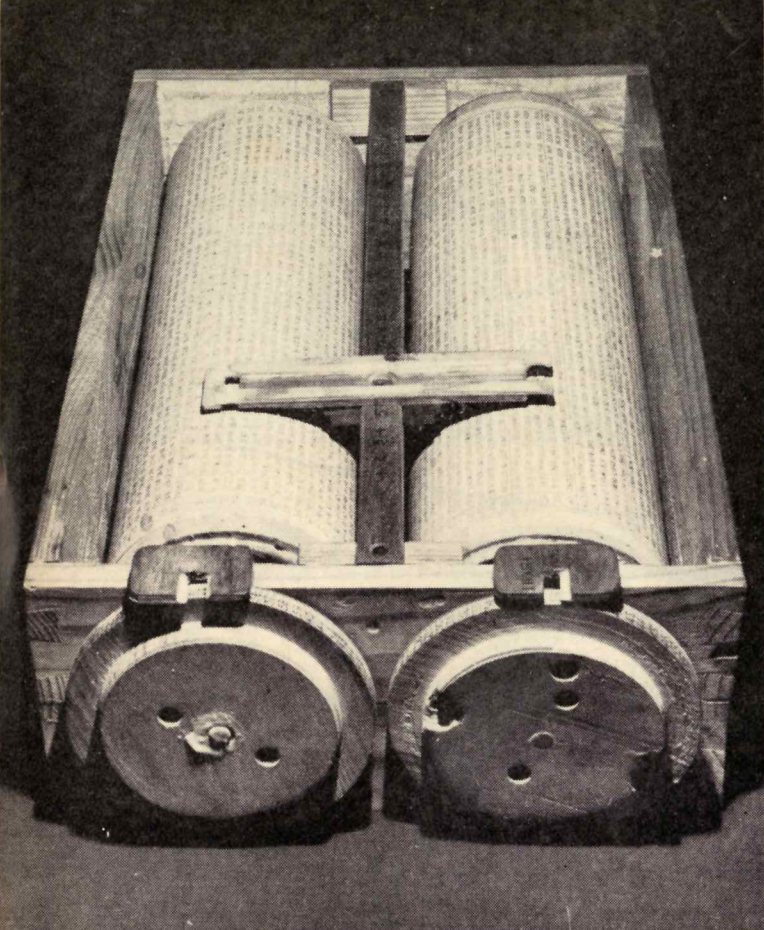




End view of the "Wooden Computer": The right-hand drum gives a direct correction of minute intervals between 1 and 2 hours. The left hand drum carries the basic table and corrects any quantity of any time units between 1 second and 60 hours. The handicap range is from 1 to 30. Drum diameter is 5 in.

Photo: A. H. Ikin

T I M E

Correcting Methods ...

BY JAMES A. L. GOW

TIME correcting in the time-on-time handicap systems used by so many sailing clubs is fairly standard in formula but varied in practical method. Because time correction represents a large proportion of a bridge crew's hardest work the good cheer, or otherwise, on the bridge depends very largely on the practical methods used to reduce the labour.

A wise committee will remember that increases in the fleet, greater variety of classes and larger entries create problems in places other than the slipway and dinghy park.

Bridge crews should be asked, on occasion, if they are happy at their work—but the occasion should be one when there are well-supported regattas elsewhere.

However, time correcting with time-on-time systems lends itself rather well to aids and devices. In general the bridge crew is given a figure for each unit of helmsman and boat and accepts that figure as the "minutes in the hour deduction" to be made from the elapsed race time of the unit.

The true definition is "sixtieths of elapsed time" to be deducted from elapsed time.

Tabulated means of simplifying the time-correcting procedure are so universal that many crew members do the job without being aware of the process of dividing the elapsed time by 60, multiplying by the handicap figure and subtracting the result from the elapsed time. All crews are aware of the pitfall of arithmetic with mixed lots of hours, minutes and seconds.

Just as a hint at an ideal—two changes would simplify things. One time unit only should be used, obviously that of seconds, and handicaps should express the proportion of the elapsed time to count, preferably as a percentage. Trends to this can be seen in the use of ratings for handicapping and the use of one second pulse-driven counters. The counters are started at 600 below zero, with the 10-minute gun, so that finishing time is elapsed time and another bit of arithmetic is eliminated.

An obvious development, not related to time correction, would be a tape-recorded time announcer synchronised with the counters and with audible output controlled by a switch at the judge's hand.

Rating systems express the proportion of elapsed time to count as a ratio to unity or 100, so that the correction is reduced to a simple multiplication. Rating is a subject covered by the process of arriving at a handicap and, except for this feature, is not for discussion here.

Time-correcting aids have the widest practical application if they are independent of power supply and the most common type is a written table which cross-references elapsed time or time periods to handicap. In its most compact form the table lists units and multiples of units of hours, minutes and seconds. Elapsed times are broken up into a suitable number of multiples, to suit those on the table, and the values of time deductions for the separate multiples are recorded from the table, added together and the total is deducted from the elapsed time to give the corrected time.

The table can be confined to a single foolscap sheet but, while it cuts out laborious multiplication, it introduces a fair amount of error liability.

At the other extreme the table could list all time periods over the likely elapsed time range against the likely handicap range. By referring to the table the total deduction for any handicap at any elapsed time could be read off direct or, in a more advanced form, the actual corrected time could be read off. This form of table reduces the error liability entirely, but raises the problem of making and accommodating a table with nearly a third of a million entries.

The pattern these tables have taken is due mostly to the confusion caused by the term "minutes in the hour". If thinking is confined to and directed to "sixtieths of time" the result is more practical.

The relevant time units are hours, minutes and seconds and, if any of these are divided by 60, the answer is in the next lowest time unit. Sixtieths of a second can be accepted as a conventional time unit for the moment. Thus if all the numbers from 1 to 60 are listed and are all multiplied by all the numbers from 1 to 30 the resulting table will have 1,800 entries, be bigger than one foolscap sheet but it will also show all the handicap deductions for handicaps from 1 to 30 for from 1 to 60 hours, 1 to 60 minutes or 1 to 60 seconds or any combination of any values in this range.

The important point, and it is by no means too much to ask of bridge crews, is that if a correction for hours is required the answer is in minutes; if a correction for minutes is required the answer is in seconds; and for seconds the answer is in sixtieths of a second.

Every entry on the table would be a whole number. The units it represents are decided by the operator so that the correction for an elapsed time of 57 hours, 57 minutes, 57 seconds at handicap 5 would be 285 minutes plus 285 seconds plus 285 sixtieths of seconds.

Adding these after conversion to suitable values and subtracting from the elapsed time would throw doubt on the amount of labour saved, but the principle of thinking and working in units should be clear.

By taking development a stage farther more work can be done with less time and labour expenditure.

TIME PERIOD	1	2	3	4	5	28	29	30	
1	.69	.58	.57	.56	.55	.32	.31	.30	1
2	1.68	1.56	1.54	1.52	1.50	1.04	1.02	1.00	2
3	2.67	2.54	2.51	2.48	2.45	1.56	1.53	1.50	3
4	3.66	3.52	3.48	3.44	3.40	2.08	2.04	2.00	4
57	56.03	55.06	54.09	53.12	52.15	30.24	29.27	28.30	57
58	57.02	56.04	55.06	54.08	53.10	30.56	29.58	29.00	58
59	58.01	57.02	56.03	55.04	54.05	31.28	30.29	29.30	59
60	59.00	58.00	57.00	56.00	55.00	32.00	31.00	30.00	60
	1	2	3	4	5	28	29	30	

The four corners of the basic table: Figures after the decimal points are sixtieths. The simplicity of the progressions, horizontally and vertically, is obvious and the table can be completed without calculations.

Instead of showing the correction to be deducted from units, the table should show the result of the deduction. Take the figure 1, divide it by 60, multiply the sixtieth by five, subtract five-sixtieths from the original figure 1 and the answer is 55-sixtieths. This is the corrected time at handicap 5 for an elapsed time of one hour, one minute or one second.

Notice that sixtieths of seconds just happen, they are not brought in at extra cost.

Going back to the 57-hour race mentioned above, against digit 57 and under handicap 5 would be the entry 52 and 15/60. This would mean a corrected time of 52 hours 15 minutes for 57 hours at handicap 5: 52 minutes 15 seconds for 57 minutes and, for 57 seconds, 52 and 15/60 seconds. An elapsed time of 57 hours 39 minutes and 5 seconds would be corrected, at handicap 5, to a total of 52 hours 15 minutes plus 35 minutes 45 seconds plus 4 and 35/60 seconds.

Compactness costs something and, in this case, it is the necessity to add three sets of times—but elapsed time is corrected by reading off three figures and adding them.

Club dinghy races tend to end within one and two hours. A table of the same pattern and size can show the corrected values for units and fractions of units between 1 plus 1/60 and 1 plus 60/60 so that the corrected value of the hour and minute elements can be read direct. The 1 to 60 table will supply the seconds corrected and the operator has only two figures to add.

Simple mechanisation has proved worth while. The tables can be drum-mounted and spun by calibrated hand dials to elapsed time while the handicap is set up with a sliding cursor. Corrected times are read direct from windows in the cursor which lines up with both drums and, usually, the corrected one hour and minutes value is added mentally to the corrected seconds value as they are displayed in the windows. A team of two, operating and recording, corrects times speedily enough to repeat the whole process with the operators' functions reversed for checking purposes.

A table covering handicaps from 1 to 30 is adequate for most time-on-time systems and it takes the form of 30 columns wide by 60 spaces down. The 1,800 entries are easy as each column is an arithmetical progression of additions of the top figure in the column and very little longhand calculation is needed. The progressions are in sixtieths but labour can be saved by showing units and sixtieths as two numbers separated by a decimal point instead of as a number and a fraction.

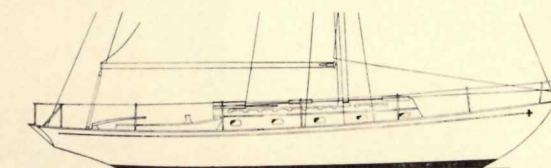
An entry of 42.45 would indicate 42 and 45/60. This has never caused confusion in any way.

Sixtieths of a second may seem superfluous and are definitely not acceptable by competitors. Within the confines of the bridge they are invaluable for breaking ties although usually the correction for seconds is rounded up or down for values above or below 30/60 as they are read out of the table. When a tie appears the precise correct times to sixtieths are consulted and the tie usually breaks on the precision.

Corrected times are then separated by one second in favour of the appropriate competitor.

A mechanised table of this type requires the minimum of operator training and supplies accurate corrected times with minimum effort in minimum time. The only disadvantage seen by the purist is that the theory and practical practice of time correction becomes even more obscure. Figures go into the box and figures come out of the box. What happens in the box becomes a complete mystery.

JOINING FORCES



C.C.A. AND R.O.R.C. COMBINING TO DEVELOP INTERNATIONAL MEASUREMENT RULE

IN a dramatic turn of events that will have a profound influence on the future of deep-water racing all over the world, the International Offshore Rules Co-ordinating Committee has issued the following statement on the outcome of its meetings in London:

"The Offshore Rules Co-ordinating Committee recognised that the present major differences between the C.C.A. and R.O.R.C. rules are capable of and should be resolved.

"A technical committee of two delegates for the C.C.A., two for the R.O.R.C. and two representing other countries has been formed to consider the two major rules, preserving as far as possible the objectives of both rules and the R.O.R.C. principle of ease and simplicity of measuring.

"This technical committee will refer back to the O.R.C.C. with a proposal for an International Rule of Measurement for offshore racing for adoption as soon as practicable, as urged by the I.Y.R.U. in November, 1966."

Between the lines of this brief statement there is a significant story of a new phase of international co-operation in the yachting world. Here is some background—supplied by the office of the Commodore of the Cruising Club of America—which will help to put this statement in perspective.

The Offshore Rules Co-ordinating Committee is a group of prominent yachtsmen and designers representing all the yachting countries on the Continent as well as in England and the United States. It is an informal group which has been meeting over the past seven years to discuss ways of simplifying the problems of distance racing under the variety of measurement rules in use throughout the world. Mostly, these meetings have merely defined the problem. Little actual co-ordination has resulted—until the April meeting attended by more than 20 representatives from nine nations.

In November of last year the I.Y.R.U. requested that the O.R.C.C., with the C.C.A. and the R.O.R.C. (the latter

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