



GPS is Out! Radio is Out! And I'm WAY Out! Home is..??? (3 of 4)

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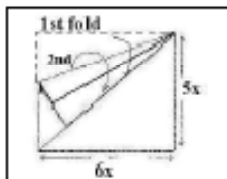


Since time immemorial, sailors have "sailed down the latitudes", i.e., found the latitude of where they wanted to get to and sailed straight down that line until they reached their destination. This was largely due to the fact that marine clocks were unheard of until John Harrison finally convinced the British Admiralty Board in 1761, after 31 years of persistent trial-and-error, that his H4 met their specifications. Without a marine clock, you couldn't tell your longitude. Without longitude, the only way to sail from England to, say, New York, was sail down from Greenwich's latitude to 40-degrees, 47-minutes, turn to starboard and just "sail down the latitude" until you hit New York City, almost 74-degrees of longitude later... So, in an emergency, you'd do the same with your homemade Quadrant... This column continuing answering what you might do when you are far at sea - celestial navigation with "string and bailing wire."

Back to the Quadrant

You may recall we started folding a piece of paper with a 5 x 6 proportion into 9 folds.

How can making 4 folds in half of the paper, implying 8 folds in total, add up to 9 folds and 90°? The answer lies in the proportion of 5 x 6. If you just take folded side of your



Quadrant and fold it across the drawn diagonal line, you will see a "tail" sticking out the other side (see figure #2)

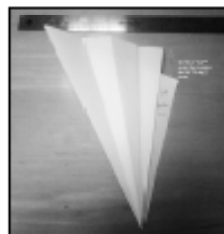


Figure #2

Now just keep folding the sectors over each other, left to right in this diagram, until you have the 8 original sectors folded over each other and the 9th "tail" sector sticking out to the right. Make a crease where the 9th sector meets the other "8" and you have the 9



Figure #3

100 sectors needed. See figure #3. Now, using the centimeter side of your ruler, try to draw 10 hatch marks across each sector of the Quadrant that you've created where the lengths are approximately the same. Each of those hatches will be very close to 10 apart. See figure 4 and 5 for clarity.

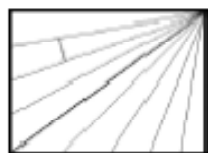


Figure #4

Accuracy is important but understand that you are still likely to get a more accurate answer when all said and done than Captain Cook did in his day... and he was quite the mariner... Now, you want

to mount the shadow-maker at the nexus of all those lines. Ideally, you can mount your Quadrant onto a board and put a nail or screw into the top corner to be the shadow-maker/gnomon.

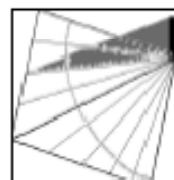
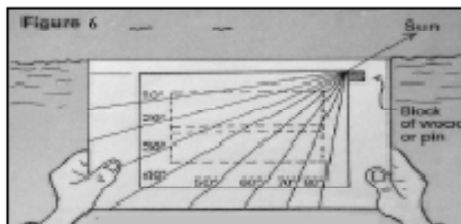


Figure #5

Hold your Quadrant upright at right-angles to the direction of the Sun and have the upper edge of the Quadrant line up with the horizon ahead. The key is to hold the Quadrant at right angles to the Sun and upright and aligned with the horizon. This may be hard on a moving deck so take multiple readings and average them. Patience is a virtue!



With permission of and thanks to Tony Crowley, Herts, England

Calculating the Sun's Declination - Its Position Relative to the Equator

OK, now, we need to get back to one of those basic requirements you need to do this - 4 simple numbers. To do so, remember this - "Help's On The Way." What? OK, the Sun crosses the equator on its northward leg around March 21 and on its southwards leg around

September 23. The Sun reaches its maximum declination of 23.45° North (this point is called the Tropic of Cancer) and South roughly 92 days later (correspondingly, the Tropic of Capricorn.) The latitudes that the Sun will have reached each 20 days it is from the equator are 8° (H!); the next 20 days to reach a declination of 15° (O!); the next 20 days to reach a declination of 20° (T!); and lastly the next 20 days to reach a declination of 23° (W!); and the remaining 11-12 days to reach a declination of 23.45°. But why is this important? With a calendar and simple math, you can figure out your latitude within a ½ degree pretty easily! For example, April 24 is 34 days after March 21. This is fourteen days or 70% of the next 20 days in the table. 70% of the amount between 8° and 15° is about 12.9°. The declination on April 24, therefore, is about 12.9°, North. Some readers may know that over a four-year period, there are annual variations in the Sun's daily declination. Except for Leap Year (an extra day), these variations can be ignored for this level of accuracy.

OK, next time, we use our Quadrant to find our latitude and we make for home!

BTW, if you are interested in being part of USCG Forces, email me at JoinUSCGAux2010@aol.com or go direct to John Blevins, who is in charge of new members matters, at FSO-PS@emcg.us and we will help you "get in this thing..."