

# Two plotters you can make yourself.

.. useful backups for coastal navigation when the GPS has fallen over board...

by  
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## A QCAD exercise

Last autumn I had a go with practicing on my QCAD program in the hope that I may switch to make computerized drawings of junk rigs in the near future.

As an exercise I made a “**Course and Range Plotter**” and a “**Bearing Plotter**” as well (see last two pages). The basic idea is not mine. I think I saw the [Course and Range Plotter](#) in a PBO-magazine many years ago and made one for myself. Unfortunately, the compass rose I used was at least a 6<sup>th</sup> generation photo copy so now I decided to make a new, clean and accurate one. The QCAD made the work super-easy. I spent less than an hour on the first version.

The two different plotters are essentially two versions of the same thing.

*Of course in these days of GPS, radar and Loran-C, such “manual” navigation may seem out-dated, but electronics sometimes fail, so this can be a good backup, and good fun too - provided you spend a little time now and then practicing the methods.*

## How to make the plotters:

- Print them out on transparent sheets.
- Cut away the rim outside the outer edge of the grid (to give a wider “frame when laminating it).
- Run them through a laminator to get semi-rigid 3-layer plotters.
- The [Course and Range Plotter](#) is then fitted with a thin, 50-70cm long string through a hole in the centre of the compass rose.
- The [Bearing Plotter](#) has no string.

## Using the Course and Range Plotter

The [Course and Range Plotter](#) is used in coastal navigation to find the course to steer and also the range between two points, A and B.

Here is the procedure:

- Place the centre of the plotter’s compass rose over position A in the map.
- With a finger holding the plotter down in the centre, align its grid with the nearest meridian in the map.
- Then while holding the plotter firmly down, the string is laid over point B and the true course is read from the compass rose.
- The true course reading must be adjusted for variation and deviation to give a compass course for the helmsman.
- The length of the string from A to B can be taken to the edge of the map and the distance measured.

After only a little practicing I have found this plotter to be easy in use.

The accuracy of the [Course and Range plotter](#) depends on the accuracy of the plotter work and of the steering compass. In addition tidal currents and leeway do their best to put you off our intended course so this is here that the [Bearing Plotter](#) comes in handy and lets you check your position from time to time.

## Using the Bearing Plotter

The **Bearing Plotter** is used to transfer sights of land- or sea-marks into bearing line(s) in the map and thus point out your position.

**Warning: Make sure that you identify the sighted marks correctly otherwise the bearings measured will be worse than useless...**

Here is how you do it:

- With your bearing compass, take one or several (magnetic) bearings of points (lighthouses or whatever).
- Correct all bearings for magnetic errors. The plotter needs true bearings to work correctly.
- Put the **Bearing Plotter** with the centre of its compass rose over the first sighted mark in the map and, just as with the **Course and Range Plotter**, align it with the meridians.
- Use a ruler through the centre of the compass rose and the true bearing and draw a light bearing line in the map.
- Repeat for the other sighted points. Your position is near where the lines cross.

The accuracy of this method mainly depends on the accuracy of the bearing compass. As they tend to be a bit un-steady the reading accuracy may vary a few degrees. In addition, since they are not used in one fixed position on the boat, they may be affected by local magnetic variations as well. To verify the level of accuracy of the method I recommend the following exercise:

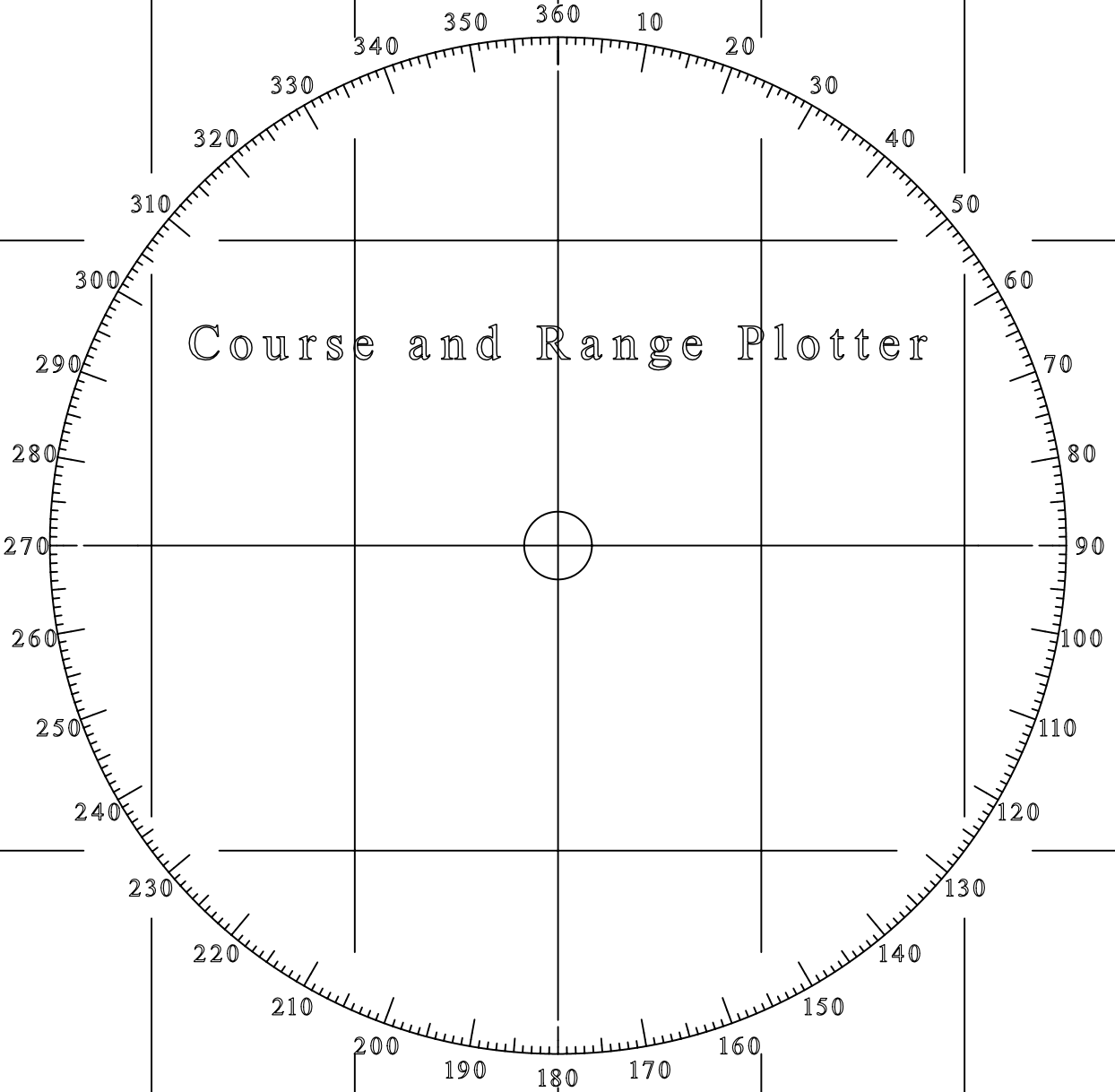
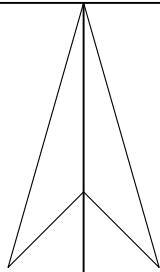
In good conditions, position your boat close to a known sea-mark. Then take several bearings and put the corrected bearing lines into the map. They will soon show you the (in-) accuracy of the method and keep you from sailing too close to shoals etc. In other words; this is a good check against the big killer in all navigation: Over-confidence.

**(.. I've worked all my life as an engineer in the technical branch of the Air Traffic Control on Stavanger Airport, among colleagues maintaining and assessing all sorts of radio navigation aids. Replaying *famous last words* from the voice recorder after an accident was no fun at all. Luckily, navigational errors on boats tends to give us sailors better odds than enjoyed by those who fly aeroplanes - or I would not be here to write this ..)**

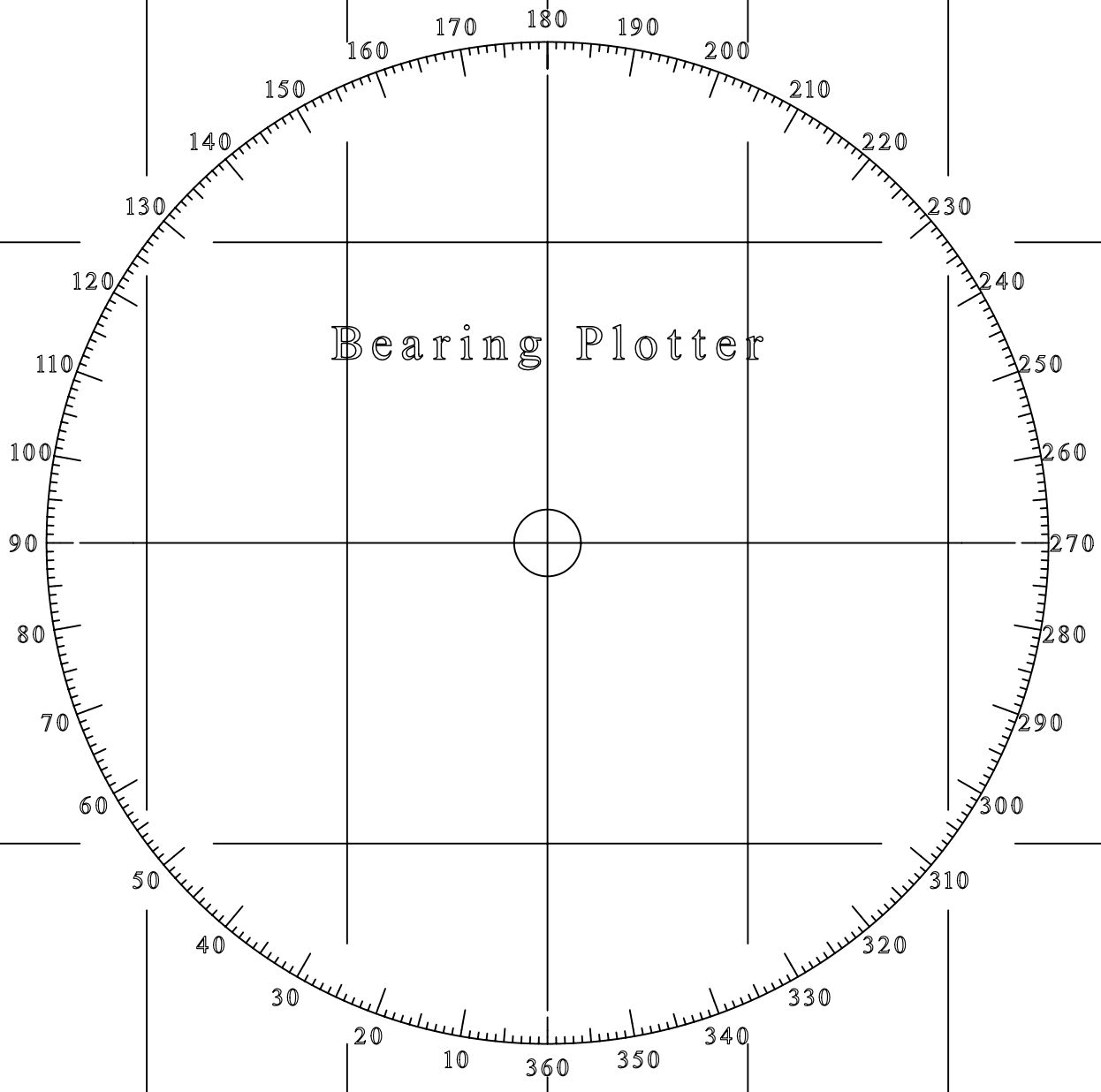
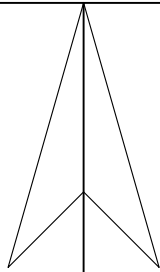
Good luck!

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PS: Thanks to Slieve McGalliard for helping me with finding the right words.



Course and Range Plotter



Bearing Plotter