How to interpret Ship's Logs

About

This document is written by Erik van Garderen to assist in people performing research using ship's logs to establish the journeys of ships. It is by no means a complete document but gives hints to make research a bit easier.

Introduction

This document is a small guide for people who are interested in the ship's logs of the Royal Navy (https://discovery.nationalarchives.gov.uk/details/r/C1762 for surface ships and shore bases and https://discovery.nationalarchives.gov.uk/details/r/C1882 for submarines) and who wish to discover where these ships have been and what they have done. The ship's logs only contain basic information, but reading between the lines can reveal some of the intents of the purpose of the journey. The ship's logs can be quite cryptical and also handwriting of certain crew members is not always of a high quality. Knowing what to expect can help to clarify information which is not clear or precise.

Abbreviations and acronyms

The logs contain quite some Nautical language, definitions and abbreviations. The list is not complete but gives an indication of what is used a lot

Term	Definition
Ω	Sunset (sun touches sea)
->|	Right hand side of object (Also R.H.E.)
|<-	Left hand side of object (Also L.H.E.)
⊣	Abeam to port
⊢	Abeam to starboard
a/c	Alter course
Closed up	This does not mean that crew members are locked up, but instead that they are close to their duty station
Co	Course
Colours	Hoisting the ensign in the morning
I.B.E.C.	In Both batteries Equalising Charge
I.P.E.C.	In Port batteries Equalising Charge
i.s.	Increase speed.
I.S.E.C.	In Stbd batteries Equalising Charge
L.H.E.	Left hand Edge
N.U.C.	Not Under Control
O.B.E.C.	Out Both batteries Equalising Charge
O.O.W.	Officer of the Watch Manoeuvres
Piping	Formal greeting of officers, ships, etc. by using a bosun's whistle.
P.O.S.	Part of Ship: This indicates that the crew can be employed anywhere over the ship for a variety of unspecified duties.
R.H.E.	Right Hand Edge
r.s	Reduce speed
S.c	Set course
Sp.	Speed

Splice the mainbrace	An extra glass of rum for all onboard.
S.S.D.	Special Sea Dutymen: The members of the crew on duty who have a special task assigned, such as manning the anchors, the ropes etc.
Up Spirits	The distribution of the 'tot' to all crew members. A tradition which ceased to exist in 1970 when it was not deemed smart anymore to have everyone drink a glass of rum at around 11:30 in the morning…

Location information

Notation

In the ship's logs, distances are quite often given in the notation 3'5, whereby an apostrophe is used instead of a decimal point, hence the value given is three and a half nautical mile (as all distances are always given in nautical miles).

With regard to bearings, the degrees and minutes are always given in the notation as we know it, but the seconds are quite often given in 10th of a minute. For example, the location of Portland Bill Light house is 50°30'51"N 2°27'24"E, but might be noted as 50°30'6,5"N 2°27'4"E.

Sources

There are a wide ranges of sources available on the Internet. However, websites come, and websites go and hence, this list may become outdated, but in that case, probably other sites might have taken over the role for the sites mentioned and a simple search query might suffice to find other usable sources. The following paragraphs describe the various type of sources:

Nautical charts

Royal Navy ship logs become available after 30 years. In addition, the ships of the Royal Navy have sailed world-wide and in areas where English is not the native language. The Admiralty Charts might use names for light houses, capes, hills and mountains which are different from the local names.

There are some interesting sources which can be used to establish where a ships have been. The following sources are used regularly by me:

- Historical Admiralty maps can be found on a variety of websites including Wikipedia. These maps are the best to look for, as these are also the maps being used by the ship's crew. Quite often, even bearings to objects such as 'brown hill', or 'white building, conspic' can be found on these maps. These objects can never be found using modern maps such as Google maps.
- Google Maps (https://maps.google.com) and Google Earth; very good sources which I use both in 'satellite' and in 'terrain' mode. The Satellite mode is used to determine how an area looks like and how it may have looked in the past (cities tend to grow in predictable ways, but Google Earth also has options to show older maps). The 'terrain' mode is very suited to find mountains and hills which may have been used to establish bearings.
- Open Seamaps (https://map.openseamap.org/): This is a very useful maps as it shows Light Houses, shoals, buoys, beacons and other navigational aids. However, the level of detail depends quite a lot on the geographical location. The level of detail is a lot higher in Europ than for example in the Inland Sea of Japan. For Open Sea Maps there are also off-line versions and programs available (Such as OpenCPN), but these require to download maps which take up a lot of hard-disk space.

- A generic web site which refers to a lot of old maps is https://www.oldmapsonline.org/.
- Certain universities have made available historical charts, but these are not always complete although they can give a very clear insight in the names used by the Royal navy compared to the original names as used by the people living in the areas concerned. Some examples of these websites are:
    - University of California in San Diego: https://library.ucsd.edu/dc/search?f[collection_sim][]=Pacific+Basin+Nautical+Charts The link provides information about the Pacific Basin, but other regions are also available.
    - University of Leiden: https://digitalcollections.universiteitleiden.nl/maps-kitlv. This collection has a lot of data of Islands around Indonesia and Malaysia.
    - Library of Scotland
- There is also a very extensive website which has exact locations of Light Houses all over the world. This website is also useful to establish where a ship has been: http://wlol.arlhs.com/index.php

Finding the locations which are used for the bearings is quite a task and the end of this document contains a list of the locations I have found and used so far…

Conversions

In order to establish the exact geographical spot where a ship has been, the log data must quite often be converted in order to ensure that the data can be used by on-line (or off-line) calculators and navigational tools.

The Royal Navy used a very special notation to write down the distance to an object. Where we are used to a period (.) or comma (,) to separate the decimal from the natural numbers, the Royal Navy crews used an apostrophe (‘). A range like 12.5 Nautical Mile was written down as 12’5 Nautical mile. Be careful as this can get confusing when angles are mentioned…

Angles are normally mentioned in degrees (°) and minutes (‘), whereby seconds (“) are sometimes used, but quite often, the minutes are broken up in tenths of a minute. When for example a location is mentioned as 1°27’7N 103°50’1E (HMS Sembawang), it has to be converted to 1°27’42”N 103°50’6”E before it can be used. Every tenth of a minute equates to six seconds.

To help with these conversions, the appendix at the end of this moment already has a lot of conversions made and tested.

Accuracy

It has to be noted that quite often multiple bearings are given for the exact moment in time, but when you verify those bearings, it can be that there might actually be an hour in between, even though are mentioned with the same time reference. In other cases, these bearings are indeed taken at the same time, and triangulation can be used to more accurately pinpoint the location. The accuracy of bearings is for most of the logs +/-0.5 NM and +/- 0.5° depending a bit on the distance, so the according estimated location will never be accurate to the yard. A bearing taken from 10 Nautical mile can based on the angle already imply that the estimated location is off by 0.08 NM in any direction, to which the error of 0,5 NM due to the distance has to be added.

For certain calculations, the regular notation of degrees (like 1°19'46"N 104°24'20"E) can’t be used and a conversion must take place towards a decimal notation (in this case N 1.3294444444444444, E 104.40555555555557). The Montana State University has a great on-line tool which is perfectly suitable to convert in both directions: http://rcn.montana.edu/Resources/Converter.aspx.

Three times a day, the geographical position was established using sun. stars or moon and duly noted in the logs. However, quite often, mistakes were made in writing down the positions. Experience has shown that bearings using objects on the shore are quite often more accurate than arbitrary positions noted down in the logs.

Some ships used radar to determine the bearing and distance. Accuracy of a radar position toward a big hill or mountain is hard to establish and can easily be a mile or more off. We don't know whether an actual peak of a mountain has been used or a slope of a mountain. The same applies to bearings towards a left or right part of an Island; do they see a shallow beach, or the first part of a bit of sloping ground or a cliff…

Establishing where a bearing was made

The pages of the Ship's Logs require the navigators of a ship to enter the geographical location three times a day. At 0400 in the morning, at 1200 (noon) and at 2000 in the evening. Using the values provided, it is already possible to create an outline of the course of a ship, although it has been found that sometimes these locations can be a degree off (which results in a 60 NM error in one direction, written down wrongly by crew member).

A single object having a bearing and distance

An example bearing shown in an actual ship's log is 1920 Horsburgh 119°-16' (HMS Alert 6 December 1963). This means that the bearing is taken at 19:20 local time onboard, with the Horsburgh Light House visible 16 Nautical Mile in the distance with a bearing of 119° on the compass. In order to establish the location of the ship, the bearing should be adapted to point in the other way (180° around). By bearings under 180°, this is done by adding 180° and by bearings over 180°, this is performed by subtracting 180° to ensure the value is always between 0° and 359°. For the bearing mentioned this results in a bearing from the Light House towards the ship of 299°. The distance obviously stays the same.

Using the website https://www.movable-type.co.uk/scripts/latlong.html, it has a paragraph called 'Destination point given distance and bearing from start point' which I use to establish the actual point of the ship at a given moment. This site requires the geographical location of the object to be noted in original geographical notation for latitude and longitude. As an example, for Horsburgh Light House, these values are: 1°19'46"N and 104°24'20"E. The bearing is of course 299° and the distance must be converted from Nautical Miles to kilometres. One Nautical mile is 1.852km. To be true, before 1970 the Nautical Mile was defined in the UK as 1.853km, but that level of accuracy is too high to worry about. Based on the website, the Destination point is given as 01° 27' 31" N, 104° 10' 21" E which is actually a strange spot, where HMS Alert could never have been:

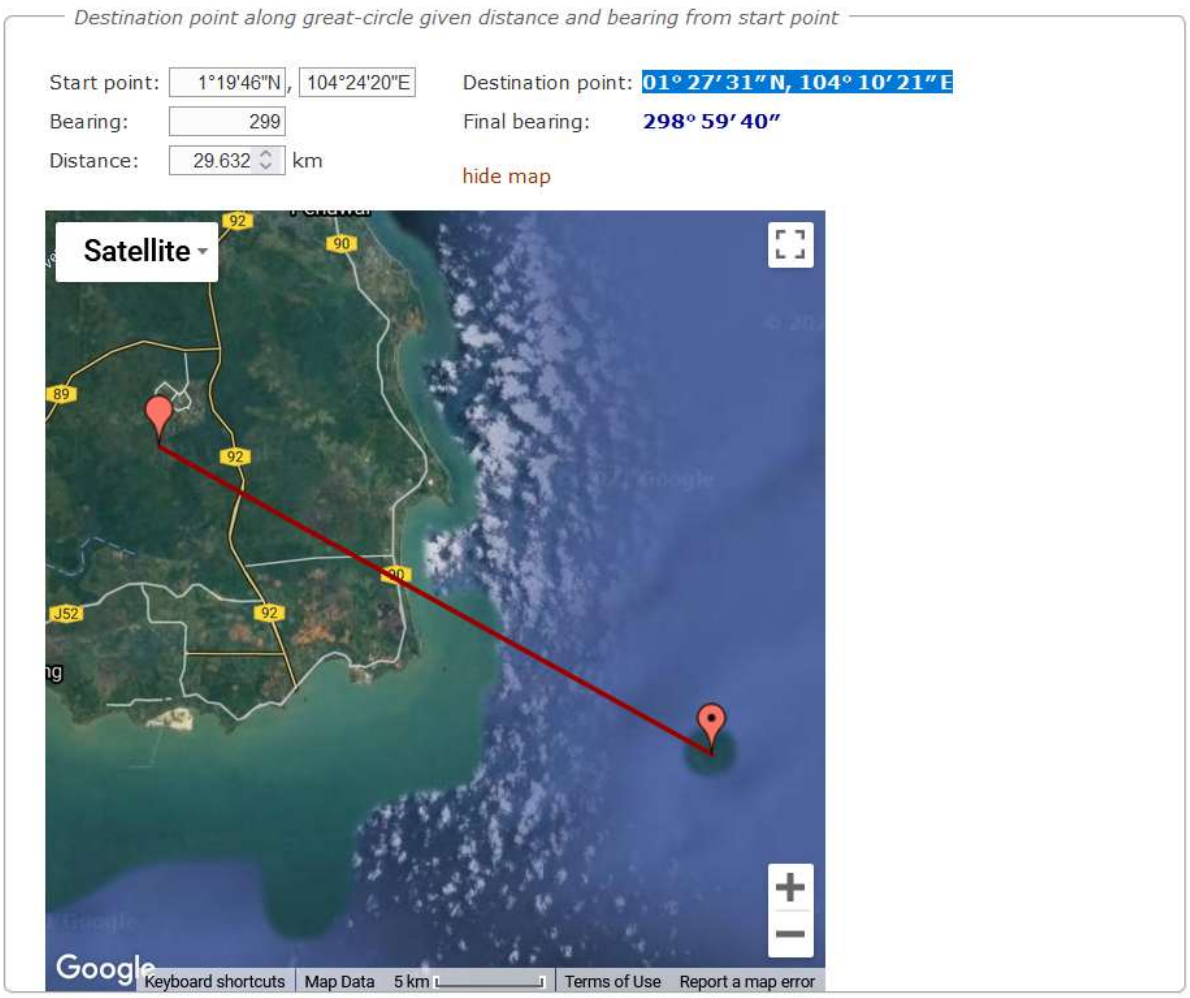

Figure 1 Sample conversion bearing/distance

To be honest, this bearing can't be used at all. It has been observed regularly that bearings are off by 180°, but in this case, it is expected that the distance might be 1.6 NM instead of 16 NM, although the page in the log does not show any indication of this.

This tool can also be used to find out about objects for which the name is not correct by using the derived position to establish the location of another object.

A bearing towards two or more objects based on distances.

Bearings can be shown as distances without any angular information. For this paragraph, the following example is used:

03:45 Pulau Balambangan 20', Kalampunian Penne 24'.

The tool which is used to establish the approximate position is https://geo.javawa.nl/coordcalc/index_en.html. This tool has a variety of functions and to establish the position function '10. Intersection of two circles' is used.

The interesting part of this function is that the result can be two possible positions, 1 possible position or none possible positions. The last one will only happen when an incorrect bearing has been made and the middle one will be very rare. Quite often the result will provide two bearings of which one will be the most likely. In the example figure, it can be seen that calculated position I1 is less likely than position I2, given the distance from position I1 to the shore.

In order to use the tool, the location of the objects has to be converted from angular degrees to decimal degrees. The website http://rcn.montana.edu/Resources/Converter.aspx is very well suited to perform this conversion.

Kalampunian	7°3'6.5"N	116°44'44.5"E	N 7.051805555555555	E 116.74569444444444
Balambangan	7°17'N	116°56'E	N 7.283333333333333	E 116.93333333333334

When the locations are given in the form, with the distances set in Nautical Mile, the estimated locations are given as I1 and/or I2. The estimated position has to be translated again from a decimal notation towards angular notation and in this case, the result will be 7°23'27.7"N 116°39'45.1"E.

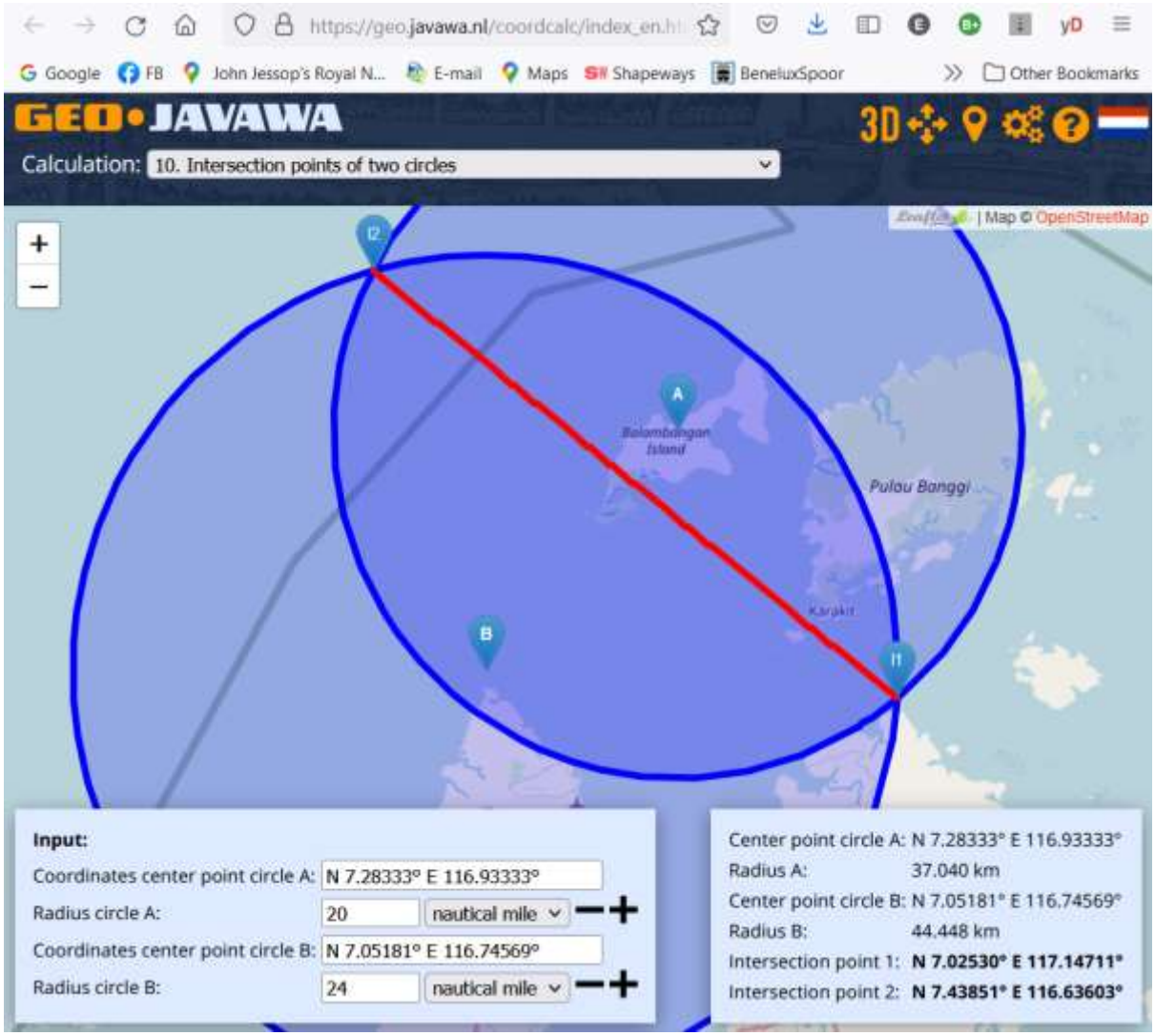

Figure 2 Location based on two distances

A bearing towards two or more objects based on compass bearings.

When logs show bearings made by two or more angles without specifying any distance (which is in fact the true triangulation), the following website is of much use: https://geo.javawa.nl/coordcalc/index_en.html. This website has a variety of options and option '4. Intersection of the lines from two points with a defined bearing' helps in obtaining the position. It must be noted that the position has to be given in decimal notation of the position of the objects

which have been used to determine the bearing and the result will have to be converted again towards a readable notation.

The following figure gives an example of how this is used.

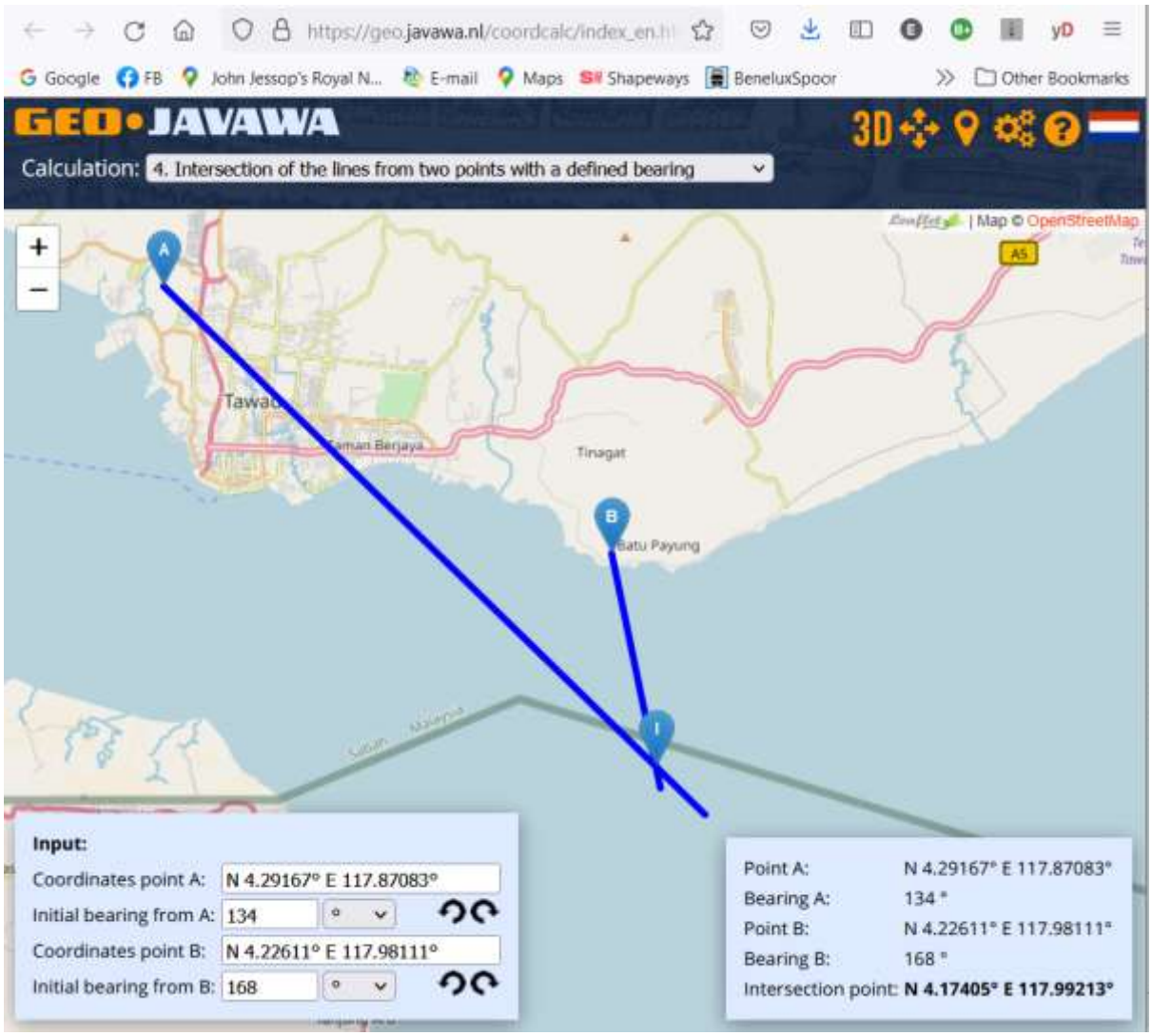

Figure 3 Location based on two angular bearings

In this example, the following log line has been used: 13:45 Kukusan 314°, Mt. Puki 348°

Based on my dataset, the following information has been obtained about these objects:

Object	Lat (Deg)	Lon (Deg)	Lat (Dec)	Long (Dec)
Batu Tinagat (Puki Lt.)	4°13'34"N	117°58'52"E	N 4.226111111111111	E 117.98111111111112
Kukusan	4°17'30"N	117°52'15"E	N 4.291666666666667	E 117.87083333333332

The translation from degrees to decimal notation is based on the website http://rcn.montana.edu/Resources/Converter.aspx.

In the form, the bearings must be rotated by 180° again, in order to obtain the right position on the map. The result given must be translated again to degrees, using the same conversion website and this leads to an estimated position of 4°10'26.6"N 117°59'31.7"E.

A bearing with a distance to one object and an angle towards another

This notation is also used in some occasions. So far, I have not been able to find a simple on-line tool to help establishing a position based on these variables.