

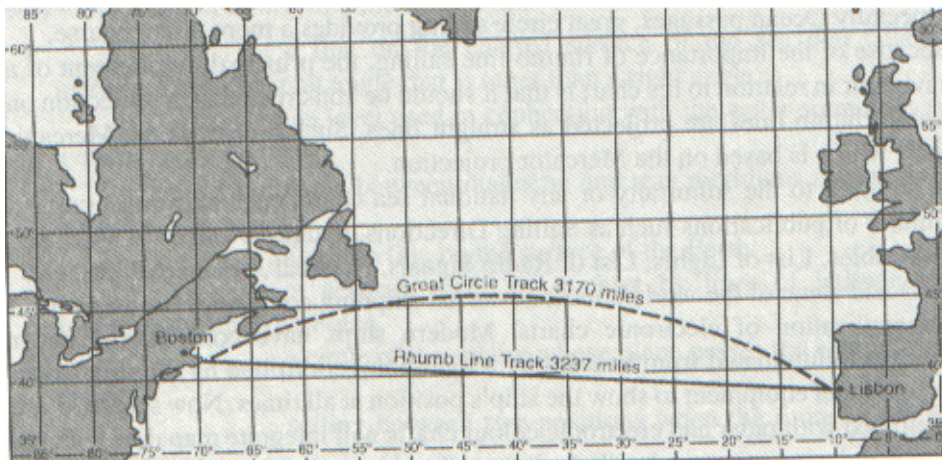
SEA CHARTS

Basic terms

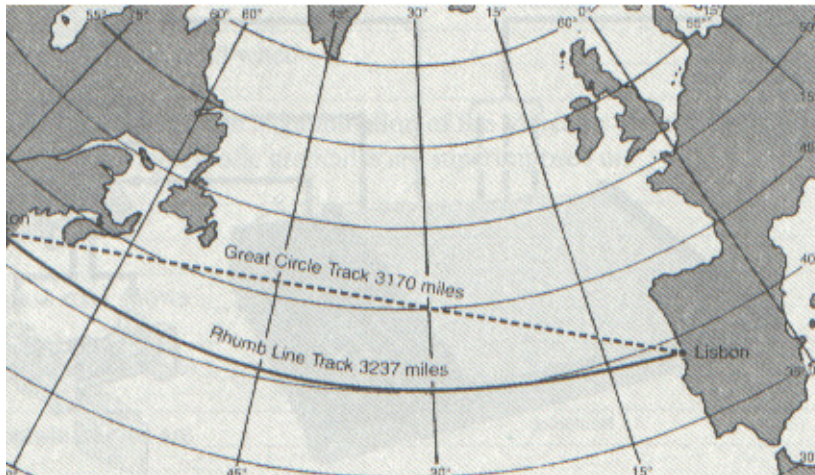
** chart * map * plane * Mercator projection chart * rhumb line * gnomonic chart * great circle = orthodromic curve * rhumb line course * hyperbolic graticule * prominent features * chart datum * variation * track * rhumb line track * great circle track * oblique angle * right/acute/obtuse angle * loxodromic curve * plotting * great circle sailing * straight line * Hydrographic Institute * nautical publications * Sailing Directions * Notices to Mariners * Tide Tables * Distance Tables * List of Lights * Nautical Almanac * Pilots * electronic chart * ecdis (electronic chart display system) * navigational equipment * map data * plotting chart/sheet * scale * graticule: lattice * compass rose * position line * navigational tools: triangle, parallel ruler, plotter, protractor, divider = compasses, nautical computer*

A chart is a representation on a plane surface of an area of a spherical surface (the Earth) used for navigational purposes. In general terms, two types of charts are produced for use, a straight-forward navigational chart, on a Mercator or equivalent projection, in which rhumb line courses appear as straight lines, and gnomonic charts, on which great circle bearings appear as straight lines in general navigation terms, ships steaming from one place to another across the sea steer rhumb line courses; charts on the gnomonic projection are used when wireless and direction-finding bearings, which travel in great circles, need to be plotted. A modern development, following the wide introduction of radio aids to navigation such as Decca, Loran, etc., is the combination of these two charts into one by the superimposition of hyperbolic graticules in colour on the navigational detail of the ordinary chart. A chart is essentially a map of a sea area, showing on it any coastlines, rocks, etc., within the area covered, the position of buoys, lighthouses, and other prominent features, the characteristics of all lights, and depths of water below the chart datum. A compass rose on every chart shows the direction and annual rate of increase or decrease of variation.

Mercator Projection: Great Circles Appear as Curves



Gnomonic Projection: Great Circles Appear Straight

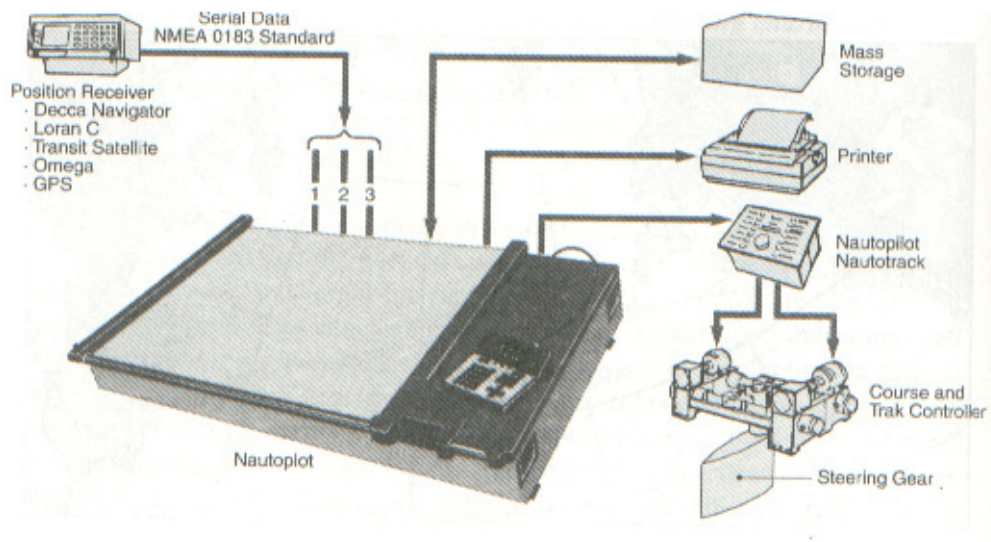


A rhumb line intersects all meridians at the same angle. On a plane surface and over relatively short distances, where the curvature of the Earth is negligible, a rhumb is used for plotting a ship's course. Over longer distances at sea, and especially Ocean passages, great circle sailing provides a more direct course. Because of the importance of rhumb-line sailing, the principal requirement of a navigator in relation to his chart is that it should be constructed on a projection on which rhumb lines are projected as straight lines. Such a chart is the Mercator chart which is based on the Mercator projection.

In addition to the Admiralty or any national sea charts each ship must carry a number of publications such as Sailing Directions, updated Notices to Mariners, Tide tables, List of Lights, List of Radio Signals, Nautical Almanac, Pilots, etc. IMO and some of the world's most advanced shipping companies have approved the application of electronic charts. Modern ships have conventional paper seacharts illuminated from beneath by a light point controlled by the ship's own navigational equipment to show the ship's position at all times. Now seacharts are combined with radar and electronic colour charts will integrate map data with the ship's radar creating a detailed picture. To this end IMO has approved the electronic chart display system (ECDIS) consisting of the electronic navigational chart (ENC) as a data file and the electronic chart display equipment.

A plotting chart (or sheet) is an outline chart on a specific scale and Mercator projection, usually showing a graticule and compass rose. It is used as all aids to a standard nautical chart, on which a navigator plots position lines obtained from astronomical observations. In the Decca, Loran-C or Omega plotting chart it is over-printed with a lattice of a hyperbolic radio navigation system.

The standard navigational tools are the triangle, parallel rulers, protractor, divider or compasses, nautical computer or calculator, etc.



A. Comprehension & vocabulary

A.1 State which terms from the Basic terms are described below:

1. _____: a line on the charted surface of the sea that cuts all meridians at a constant angle that is other than a right angle.
2. _____: sea level used in connection with the water soundings on a chart.
3. _____: angle between magnetic and true meridians at any given position.
4. _____: a rhumb line on the surface of the Earth.
5. _____: a network made on a chart by lines of latitude and longitude or by hyperbolae.
6. _____: a circle of the sphere whose plane passes the centre of the sphere.
7. _____: sailing between two positions when the route is along a great circle.
8. _____: a sheet of plain or squared paper on which a navigator draws position lines obtained from astronomical observations.
9. _____: graduated circles on a chart indicating the direction of true and magnetic North and angular values from these points.
10. _____: a line on a chart drawn through all positions at which a ship may be situated.

A.2 Complete the following sentences (see the reading text):

1. Do the rhumb lines in the Mercator projection appear as _____?
2. On gnomonic charts straight lines represent the _____
3. Gnomonic charts are used when _____
4. Decca and Loran charts are a combination of the Mercator and the gnomonic chart in which the hyperbolic graticules are superimposed on _____
5. A sea chart shows _____
6. A compass rose shows _____

7. A rhumb line intersects _____
8. Loxodromic curves are _____
9. Along with a set of seacharts a ship also carries a number of publications such as _____
10. In the near future electronic colour charts will integrate _____
11. The plotting chart is used as an aid on which _____
12. Decca or Omega plotting charts are overprinted with _____

A.3 Give full forms for the following sea chart abbreviations:

1. G _____
2. B _____
3. Cr _____
4. pk _____
5. Str _____
6. Pass _____
7. Thoro _____
8. Chan _____
9. Entr _____
10. Est _____
11. Mth _____
12. Anch _____
13. Hbr _____
14. P _____
15. I _____
16. Pen _____
17. C _____
18. Pt _____
19. Rk _____

B. Grammar

B.1 Supply the right form of the verb in brackets:

Electronic charts

The trend towards the introduction of electronic charts (*accelerate*) 1. _____ within recent years. A modern nautical chart (*originate*) 2. _____ from a map (*show*) 3. _____ shorelines, depth contours, shoals, rocks, and other dangers, and a growing mass of information about currents, tides, harbours etc. Many people (*not agree*) 4. _____ and see the use of electronic charts as running parallel with the use of paper charts.

Electronic charts (*use*) 5. _____ for main routes only, and only after shipowners and authorities (*become*) 6. _____ convinced of the need. At the first stage the information from the radio-navigation aids such as Loran and radar (*integrate*) 7. _____ and (*display*) 8. _____ on the screen combined perhaps with the addition of some coastline information and navigational way points. Probably the most important advantage of a seachart (*be*) 9. _____ to display the position of the ship on the chart and (*maintain*) 10. _____ a continuous plot (*include*) 11. _____ the full accuracy of any navaid in use. So, the navigator (*be able*) 12. _____ to see at a glance where he (*be*)

13. _____ without (*have*) 14. _____ to plot a fix. It (*be*) 15. _____, however, hard to believe that the navigator (*give up*) 16. _____ his paper chart easily.

B.2 Classify the following words according to the pronunciation of the stressed syllable:

· chart · plane · surface · navigational · Mercator · rhumb · straight · gnomonic · circle bearing · radio · aids · Loran · Decca · hyperbolic · graticule · feature · datum · compass · annual · variation · line · meridian · oblique · angle · loxodromic · negligible · passage · provide · publication · almanac · nautical · pilots · company · equipment · radar · integrate · display · file · navigator · astronomical · lattice · triangle

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C. Writing skills

C.1 Find and underline the sentences in the reading text which provide answers to the questions below:

1. What are the two types of charts used in navigation?
2. On what courses do ships steer when crossing the seas or oceans?
3. When are gnomonic charts used?
4. What is shown on a sea chart?
5. What does the compass rose show?
6. What are the loxodromic curves?
7. Why is great circle sailing better over long distances at sea?
8. Where are rhumb lines projected as straight lines?
9. Which publications are carried on each ship?
10. What are the most recent developments in making sea charts?
11. What are the map data integrated with?
12. What is a plotting chart?