

How a position circle is placed on a chart in practice.

Position line. Intercept.

A simple description of how a position line is obtained from the observed Altitude of a heavenly body by :—

- (i) A Meridian Altitude.
 - (ii) An Ex-Meridian Altitude.
 - (iii) An Altitude of Polaris.
 - (iv) An Altitude with an assumed latitude (Longitude by chronometer).
 - (v) An Altitude with an assumed Dead Reckoning position (Marcq St. Hilaire).
- (o) Magnetic meridian. Deviation and variation of the magnetic compass. Correction of compass courses and bearings to magnetic or true courses and bearings and *vice versa*.
- (p) The simple properties of a Mercator's Chart with regard to courses and bearings, longitude and latitude scales, and the measurement of distance. Rhumb lines. Meridional Parts.

37. Paper 2. (Written.)

PRACTICAL NAVIGATION I. (Including Tides.) (2 hours.)

- (a) To calculate approximate time of high water by the use of the High Water Full and Change constant. To find the time and height of high and low water at Standard Ports (Admiralty Tide-tables). To find the height of tide at a given time intermediate between high and low water, and thence by use of tables or diagram to determine approximate corrections to soundings and heights of objects above sea-level taken at such intermediate times. Chart datum lines.
- (b) To find course and distance, departure, and difference of latitude between two points by means of the Traverse Table. Practical use of formula connecting departure, difference of longitude and middle latitude.
- (c) To find the course and distance between two points by the use of meridional parts (Mercator Sailing).
- (d) Chronometers. Stowage at safe distance from magnetic and electrical instruments. Management and care. Handling, winding, comparing. Writing up chronometer journal. Value of daily comparisons. Wireless and other time signals for rating chronometers.
- (e) To find true bearing of any heavenly body by Azimuth or Amplitude Tables, diagram, or any other method the candidate may select. To find the error of the compass, and thence the deviation.

38. Paper 3. (Written.)

PRACTICAL NAVIGATION II. (3 hours.)

(In the correction of observed altitudes, total correction tables may be used.)

- (a) By the use of the Traverse Table, to obtain the Dead Reckoning position of the ship at any time, given compass courses and errors, and the run recorded by log or calculated by estimated speed and time by standard clock. The candidate may be asked to allow for the effects of current and wind.
- (b) To find the latitude by Meridian Altitude of sun, star, moon, or planet, and to determine a position line by this means.
- (c) To work an ex-Meridian altitude of the sun, and thence to find a position line.
- (d) To determine from observed altitude of sun, star, moon, or planet a position line on which the ship is by longitude by chronometer method if suitable, or by any other method (*e.g.*, Marcq St. Hilaire) at the discretion of the candidate.
- (e) Given one position line, knowing the speed of ship and interval of time between observations, to transfer such position line to that obtained from meridian or ex-meridian altitude, and thence to determine the ship's position at time of second observation.