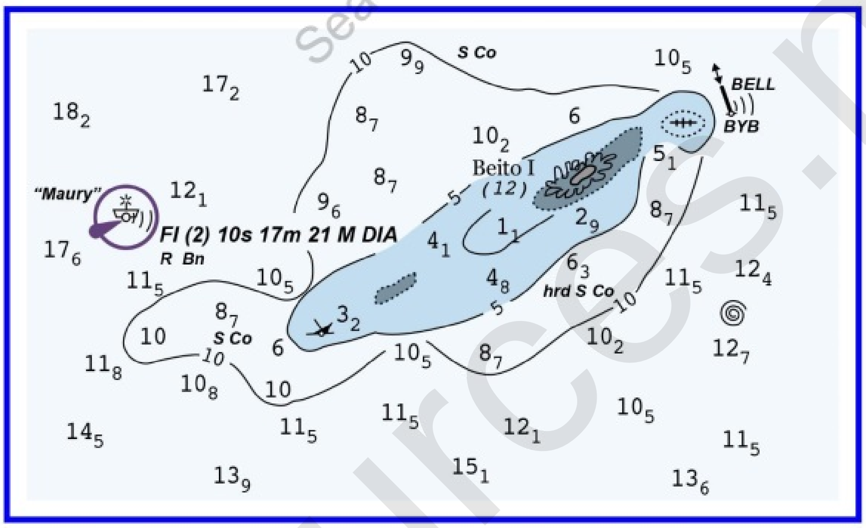
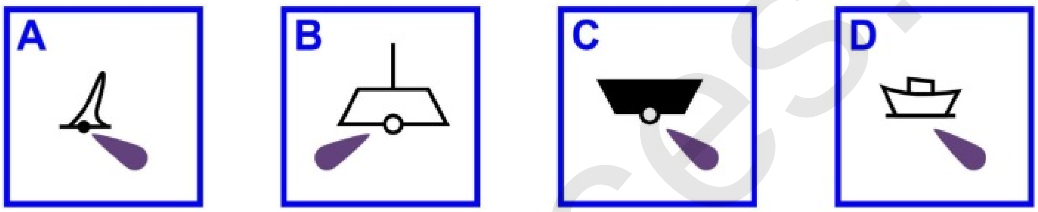
D010NG



d010ng_wm_082918

D015NG



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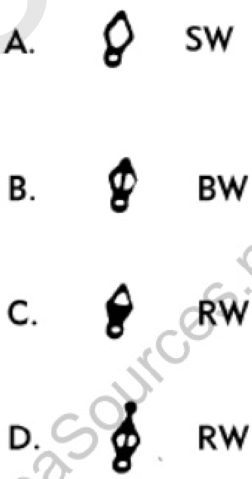


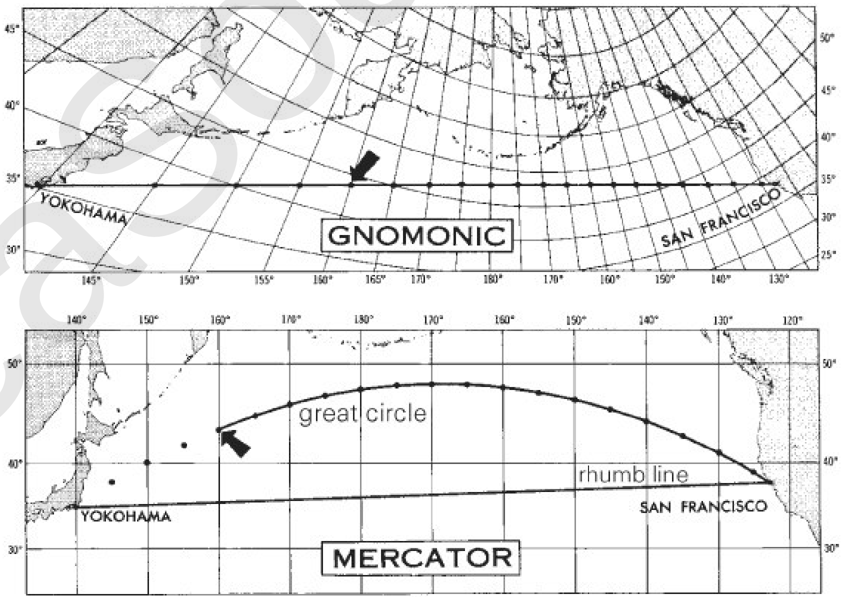
D032NG

d032ng_wm_012914

D033NG

RW
"A"

d033ng_wm_090518



gnomonicchart

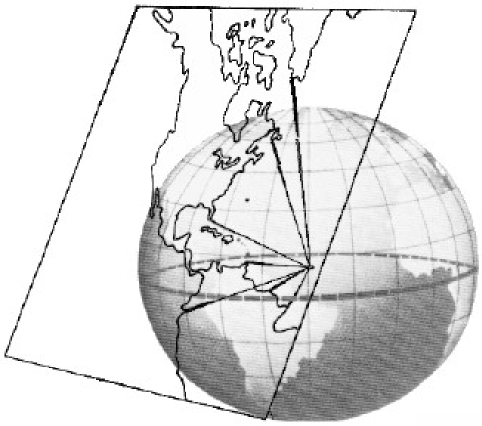


Figure 316a. An oblique gnomonic projection.

The usefulness of this projection rests upon the fact

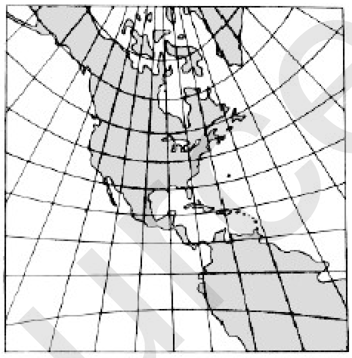
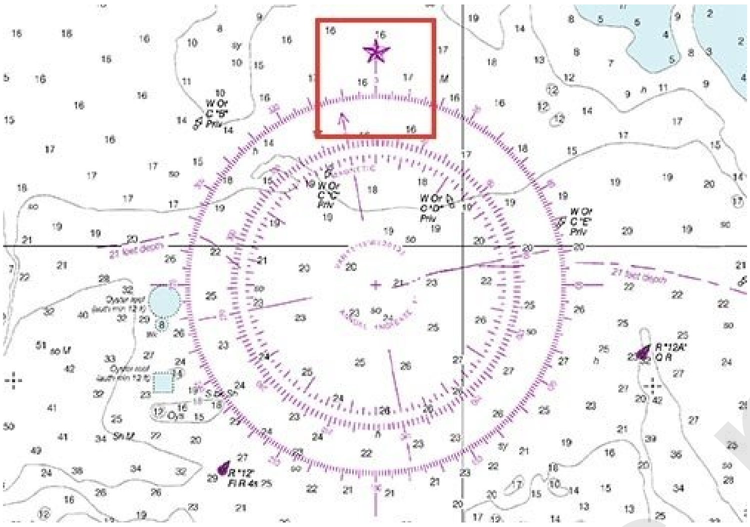


Figure 316b. An oblique gnomonic map with point of tangency at latitude 30°N, longitude 90°W.

that any great circle appears on the map as a straight line, giving charts made on this projection the common name **great-circle charts**.

Gnomonic charts are most often used for planning the great-circle track between points. Points along the determined track are then transferred to a Mercator projection. The great circle is then followed by following the rhumb lines from one point to the next. Computer programs which automatically calculate great circle routes between points and provide latitude and longitude of corresponding rhumb line endpoints are quickly making this use of the gnomonic chart obsolete.

gnomonicprojection



inner ring of a compass rose

313. Lambert Conformal Projection

The useful latitude range of the simple conic projection can be increased by using a secant cone intersecting the earth at two standard parallels. See Figure 313. The area between the two standard parallels is compressed, and that beyond is expanded. Such a projection is called either a **secant conic** or **conic projection with two standard parallels**.

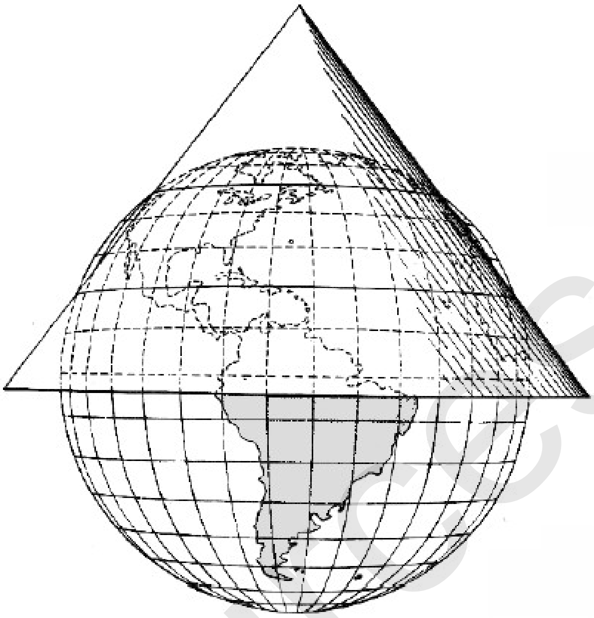


Figure 313. A secant cone for a conic projection with two standard parallels.

If in such a projection the spacing of the parallels is altered, such that the distortion is the same along them as along the meridians, the projection becomes conformal. This modification produces the **Lambert conformal projection**. If the chart is not carried far beyond the standard parallels, and if these are not a great distance apart, the distortion over the entire chart is small.

A straight line on this projection so nearly approximates a great circle that the two are nearly identical. Radio beacon signals travel great circles; thus, they can be plotted on this projection without correction. This feature, gained without sacrificing conformality, has made this projection popular for aeronautical charts because aircraft make wide use of radio aids to navigation. Except in high latitudes, where a slightly modified form of this projection has been used for polar charts, it has not replaced the Mercator projection for marine navigation.

CHARACTERISTICS OF LIGHTS

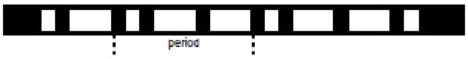
Illustration | **Type Description** | **Abbreviation**

1. FIXED.
A light showing continuously and steadily.
F

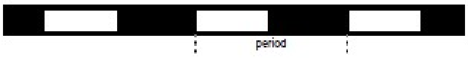
2. OCCULTING.
A light in which the total duration of light in a period is longer than the total duration of darkness and the intervals of darkness (eclipses) are usually of equal duration

2.1 Single-occulting.
An occulting light in which an eclipse is regularly re-peated
Oc

2.2 Group-occulting.
An occulting light in which a group of eclipses, specified in numbers, is regularly repeated.
Oc (2)



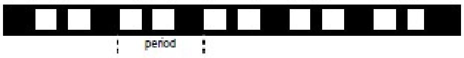
2.3 Composite group-occulting.
A light, similar to a group-occulting light, except that successive groups in a period have different numbers of eclipses.
Oc (2+1)



3. ISOPHASE.
A light in which all durations of light and darkness are equal.
Iso

4. FLASHING.
A light in which the total duration of light in a period is shorter than the total duration of darkness and the appearances of light (flashes) are usually of equal duration.

4.1 Single-flashing.
A flashing light in which a flash is regularly repeated (frequency not exceeding 30 flashes per minute).
Fl



4.2 Group-flashing.
A flashing light in which a group of flashes, specified in number, is regularly repeated.
Fl (2)

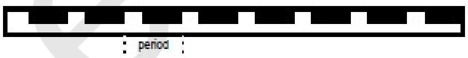
4.3 Composite group-flashing.
A light similar to a group flashing light except that successive groups in the period have different numbers of
Fl (2+1)

5. QUICK.
A light in which flashes are produced at a rate of 60 flashes per minute.

5.1 Continuous quick.
A quick light in which a flash is regularly repeated.
Q

5.2 Interrupted quick.
A quick light in which the sequence of flashes is interrupted by regularly repeated eclipses of constant and long duration.
I Q

6. MORSE CODE.
A light in which appearances of light of two clearly different durations (dots and dashes) are grouped to represent a character or characters in the Morse code.
Mo (A)



7. FIXED AND FLASHING.
A light in which a fixed light is combined with a flashing light of higher luminous intensity.
F Fl

8. ALTERNATING.
A light showing different colors alternately
Al RW

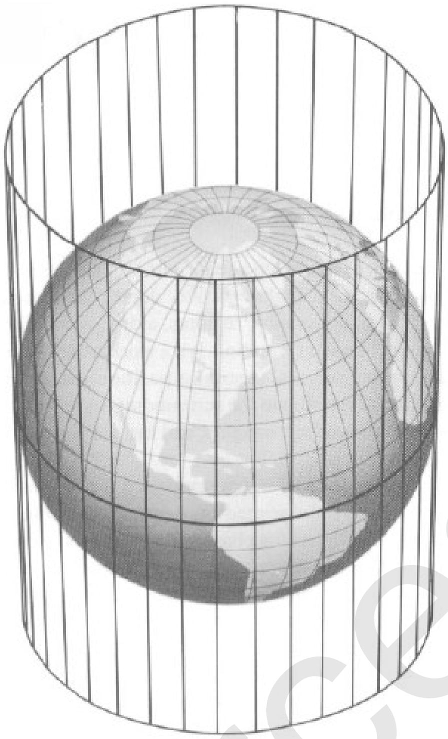
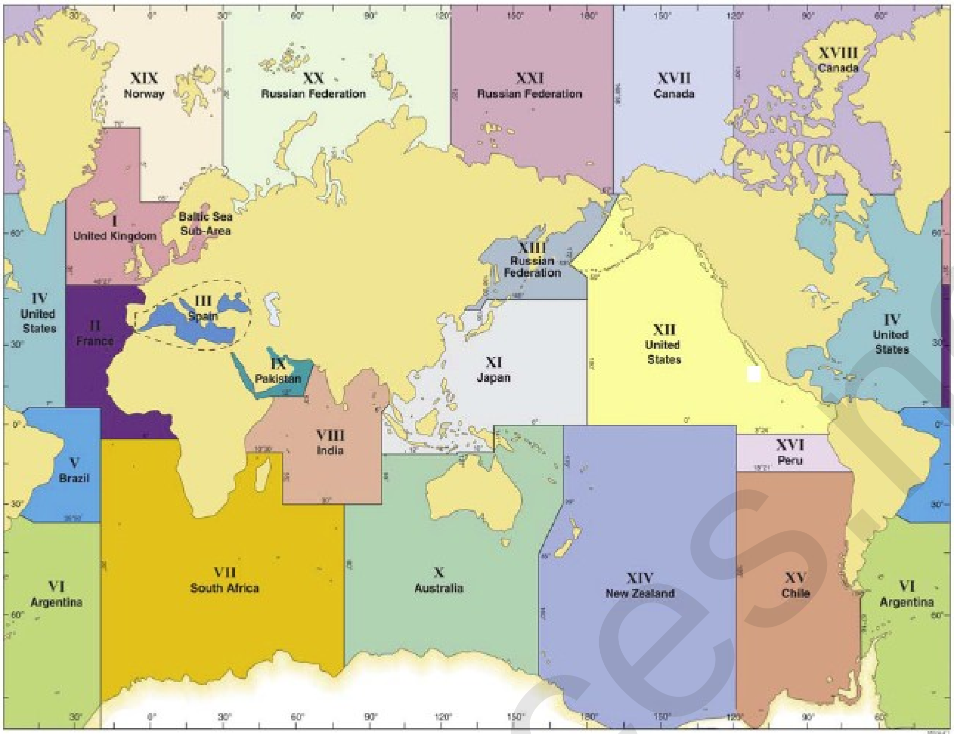


Figure 304. A cylindrical projection.

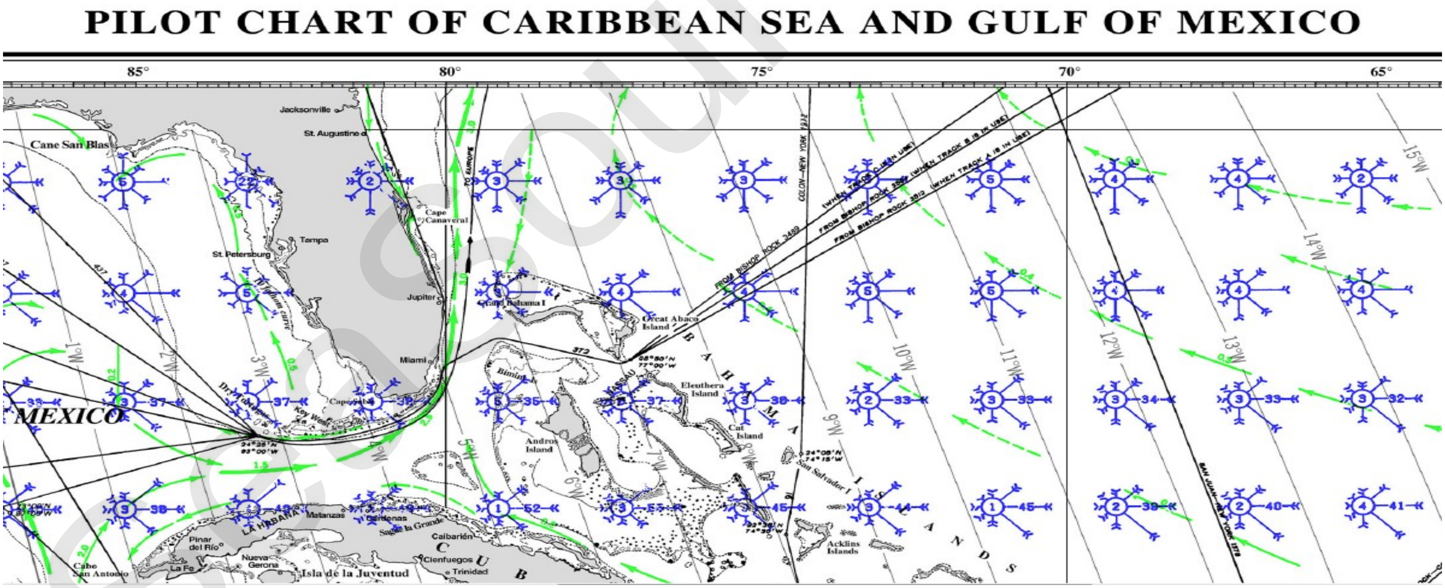
305. Mercator Projection

Navigators most often use the plane conformal projection known as the **Mercator projection**. The Mercator projection is not perspective, and its parallels can be derived mathematically as well as projected geometrically. Its distinguishing feature is that both the meridians and parallels are expanded at the same ratio with increased latitude. The expansion is equal to the secant of the latitude, with a small correction for the ellipticity of the earth. Since the secant of 90° is infinity, the projection cannot include the poles. Since the projection is conformal, expansion is the same in all directions and angles are correctly shown. Rhumb lines appear as straight lines, the directions of which can be measured directly on the chart. Distances can also be measured directly if the spread of latitude is small. Great circles, except meridians and the equator, appear as curved lines concave to the equator. Small areas appear in their correct shape but of increased size unless they are near the equator.

mercatorprojection



navareas

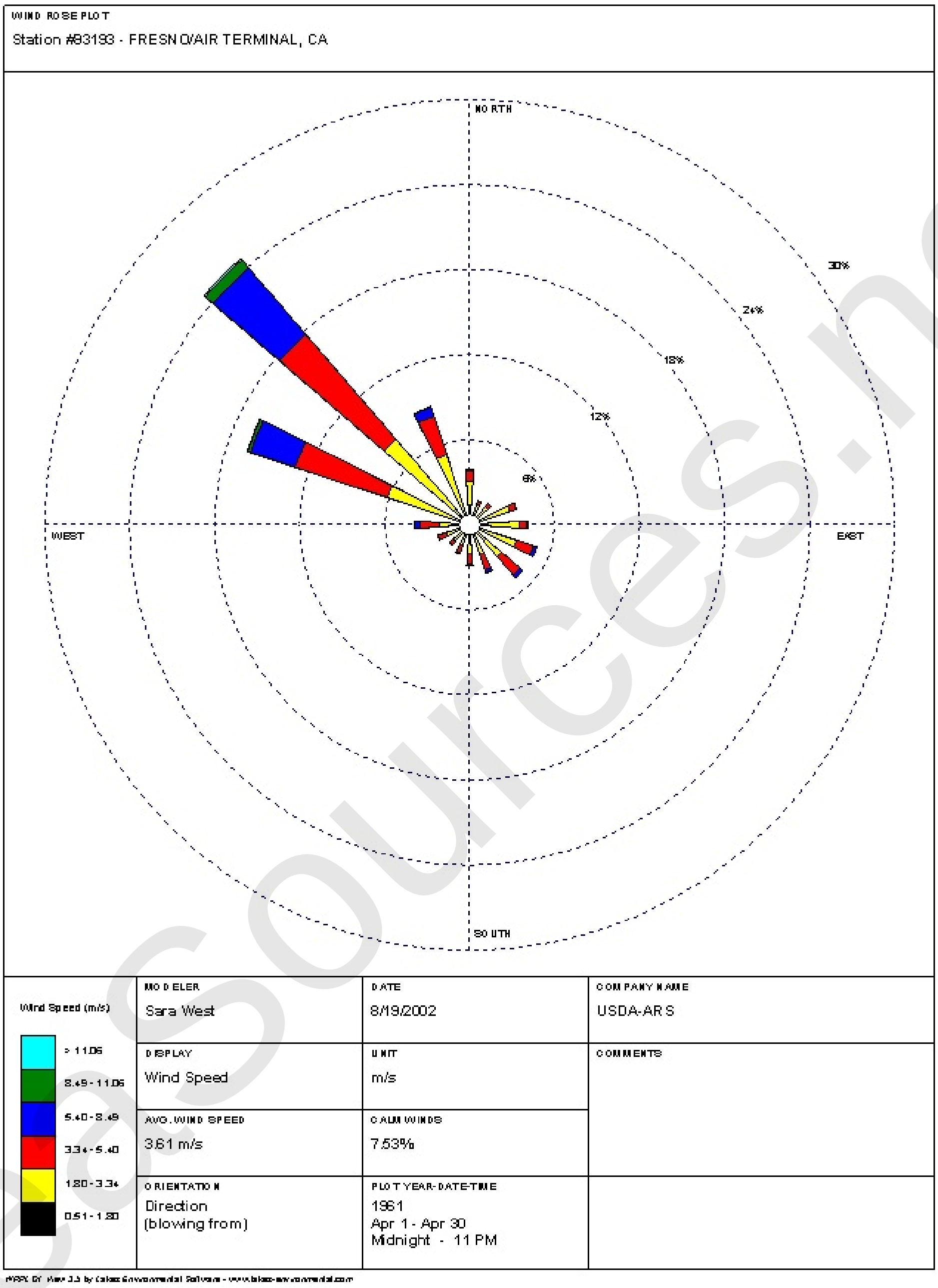


pilotchart1

EXPLANATION OF WIND ROSES: The wind roses in blue color are located in the center of each 5° square. Each rose shows the distribution of the winds that have prevailed in the area over a considerable period of time. The wind percentages are summarized for calm and for the Cardinal and Intercardinal compass points. The arrows fly with the wind, indicating the direction from which the wind blew. The length of the shaft, measured from the outside of the circle to the end of the visible shaft (not necessarily to the end of the last feather), using the appropriate scale below, gives the percentage of the total number of observations in which the wind has blown from that direction. The number of feathers shows the average force of the wind on the Beaufort scale. The figure in the center of the circle gives the percentage of calms. When the arrow is too long (over 29 percent) to fit conveniently in the 5° square, the percentage is indicated numerically on the shaft.

FOR EXAMPLE: The sample wind rose should be read thus: In the reported observations the wind has averaged as follows: From N. 32 percent, force 5; from N.E. 11 percent, force 4; from E. 8 percent, force 4; from S.E. 4 percent, force 4; from S. 3 percent, force 4 ; from S.W. 5 percent, force 4; from W. 10 percent, force 4; from N.W. 25 percent, force 4; calms 2 percent.

windrose



wind_rose_plot