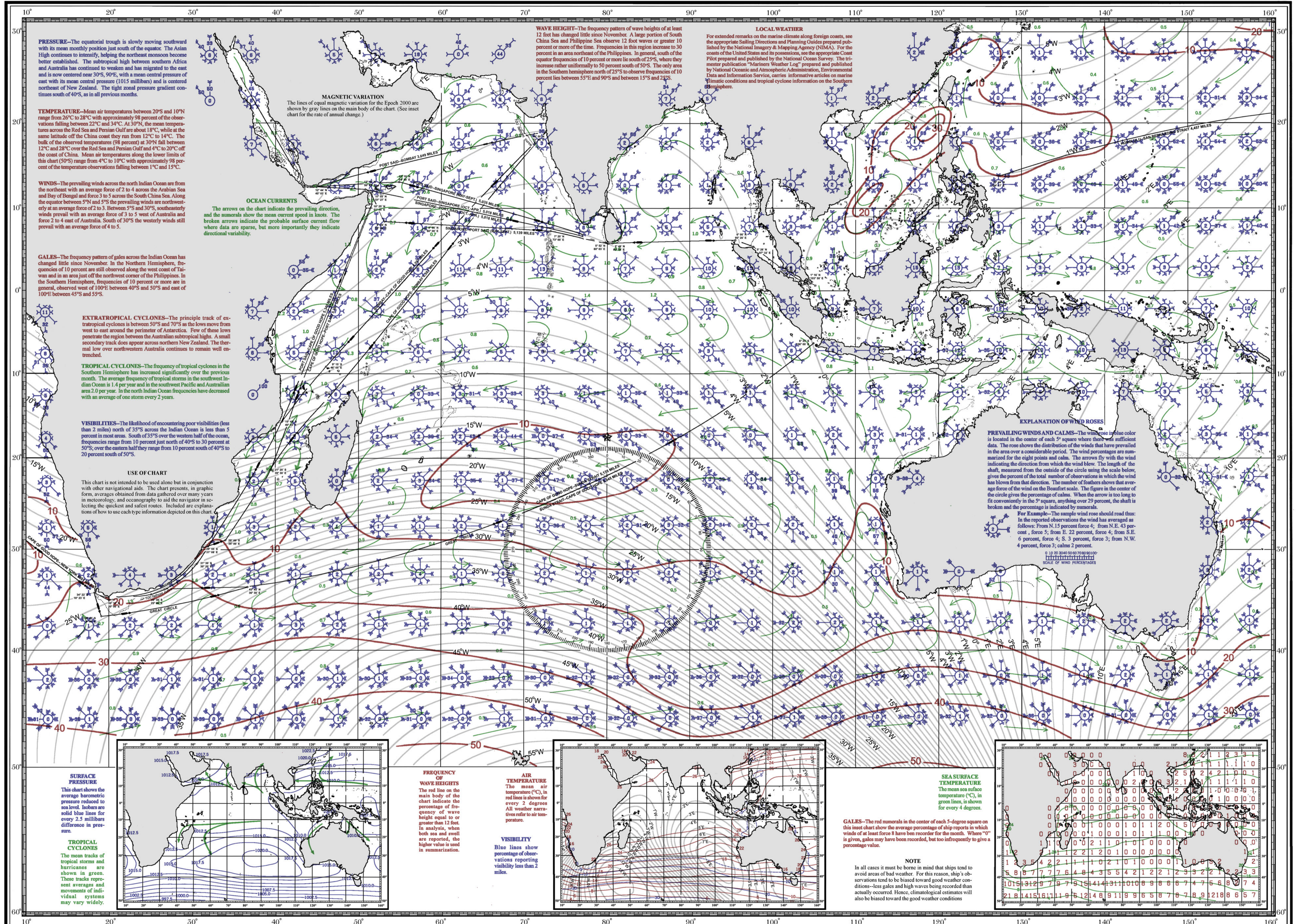




PILOT CHART OF THE INDIAN OCEAN

DECEMBER



PRESSURE—The equatorial trough is slowly moving southward with its mean monthly position just south of the equator. The Asian High continues to intensify, helping the northeast monsoon become better established. The subtropical high between southern Africa and Australia has continued to weaken and has migrated to the east and is now centered near 30°S, 90°E, with a mean central pressure of east with its mean central pressure (1015 millibars) and is centered northeast of New Zealand. The tight zonal pressure gradient continues south of 40°S, as in all previous months.

TEMPERATURE—Mean air temperatures between 20°S and 10°N range from 26°C to 28°C with approximately 98 percent of the observations falling between 22°C and 34°C. At 30°N, the mean temperatures across the Red Sea and Persian Gulf are about 18°C to 14°C. The bulk of the observed temperatures (98 percent) at 30°N fall between 12°C and 28°C over the Red Sea and Persian Gulf and 4°C to 20°C off the coast of China. Mean air temperatures along the lower limits of this chart (50°S) range from 4°C to 10°C with approximately 98 percent of the temperature observations falling between 1°C and 15°C.

WINDS—The prevailing winds across the north Indian Ocean are from the northeast with an average force of 2 to 4 across the Arabian Sea and Bay of Bengal and force 3 to 5 across the South China Sea. Along the equator between 5°W and 5°E the prevailing winds are westerly at an average force of 2 to 3. Between 5°S and 30°S, southeasterly winds prevail with an average force of 3 to 5 west of Australia and force 2 to 4 east of Australia. South of 30°S the westerly winds still prevail with an average force of 4 to 5.

GALES—The frequency pattern of gales across the Indian Ocean has changed little since November. In the Northern Hemisphere, frequencies of 10 percent are still observed along the west coast of Taiwan and in an area just off the northwest corner of the Philippines. In the Southern Hemisphere, frequencies of 10 percent or more are in general, observed west of 100°E between 40°S and 50°S and east of 100°E between 45°S and 55°S.

EXTRATROPICAL CYCLONES—The principle track of extratropical cyclones is between 50°S and 70°S as the lows move from west to east around the perimeter of Antarctica. Few of these lows penetrate the region between the Australian subtropical highs. A small secondary track does appear across northern New Zealand. The thermal low over northwestern Australia continues to remain well entrenched.

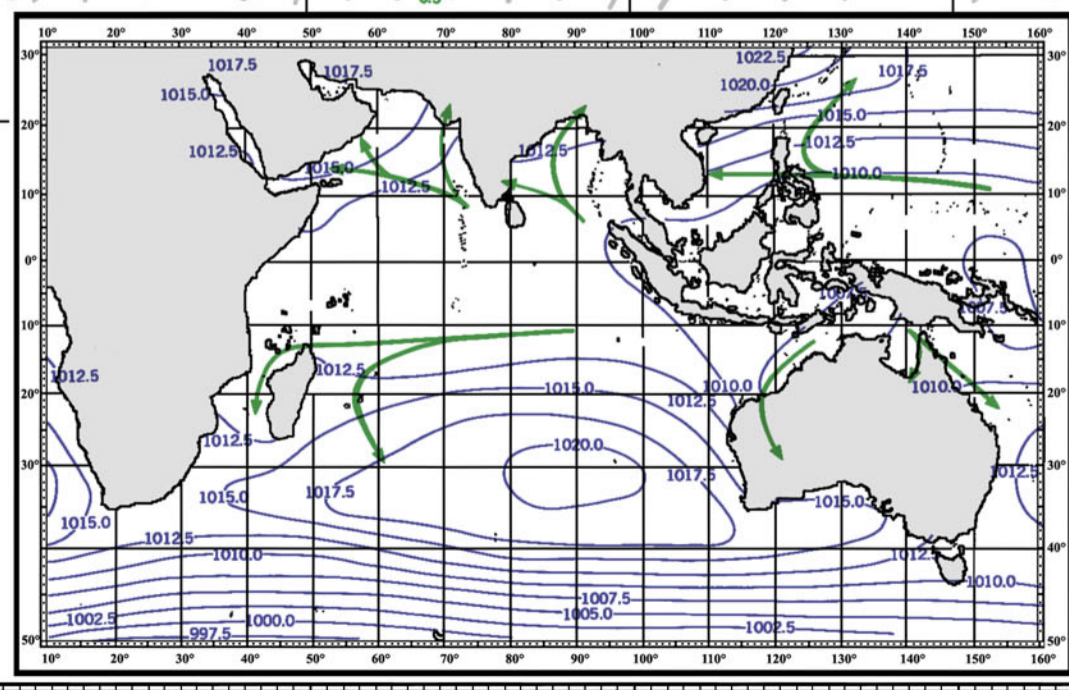
TROPICAL CYCLONES—The frequency of tropical cyclones in the Southern Hemisphere has increased significantly over the previous month. The average frequency of tropical storms in the southwest Indian Ocean is 1.4 per year and in the southwest Pacific and Australian area 2.0 per year. In the north Indian Ocean frequencies have decreased with an average of one storm every 2 years.

VISIBILITIES—The likelihood of encountering poor visibilities (less than 2 miles) north of 35°S across the Indian Ocean is less than 5 percent in most areas. South of 35°S over the western half of the ocean, frequencies range from 10 percent just north of 40°S to 30 percent at 50°S; over the eastern half they range from 10 percent south of 40°S to 20 percent south of 50°S.

USE OF CHART
This chart is not intended to be used alone but in conjunction with other navigational aids. The chart presents, in graphic form, averages obtained from data gathered over many years in meteorology, and oceanography to aid the navigator in selecting the quickest and safest routes. Included are explanations of how to use each type of information depicted on this chart.

SURFACE PRESSURE
This chart shows the average barometric pressure reduced to sea level. Isohars are solid blue lines for every 2.5 millibars difference in pressure.

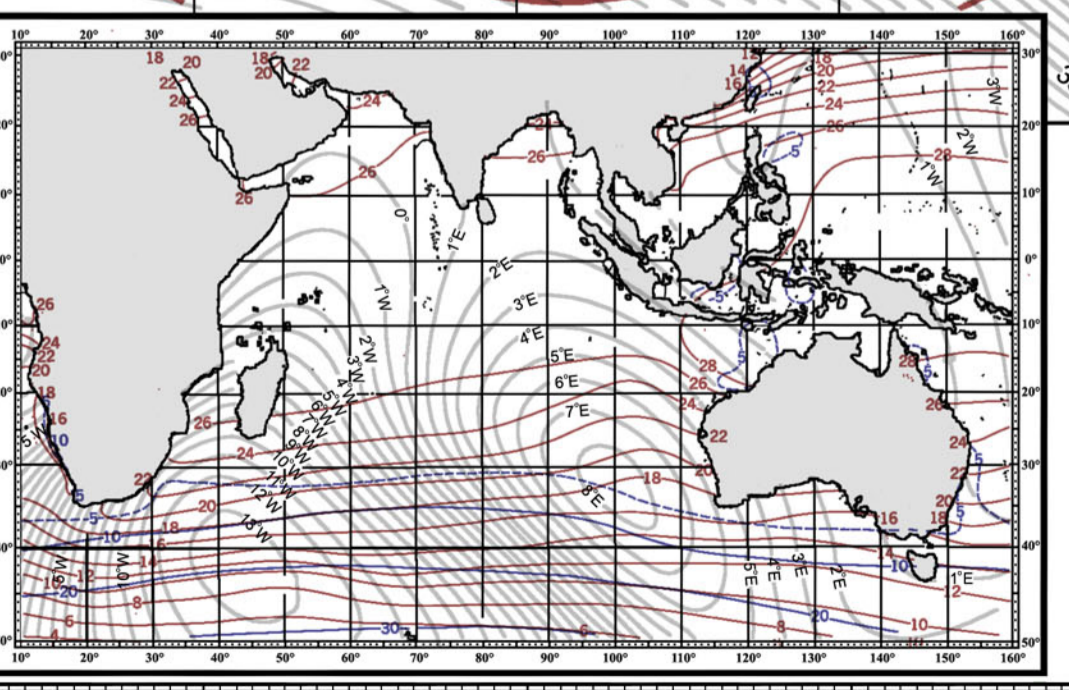
TROPICAL CYCLONES
The mean tracks of tropical storms and hurricanes are shown in green. These tracks represent averages and movements of individual systems may vary widely.



FREQUENCY OF WAVE HEIGHTS
The red line on the main body of the chart indicates the percentage of frequency of wave height equal to or greater than 12 feet. In analysis, when both sea and swell are reported, the higher value is used in summarizing.

AIR TEMPERATURE
The mean air temperature (°C), in red lines is shown for every 2 degrees. All weather narratives refer to air temperature.

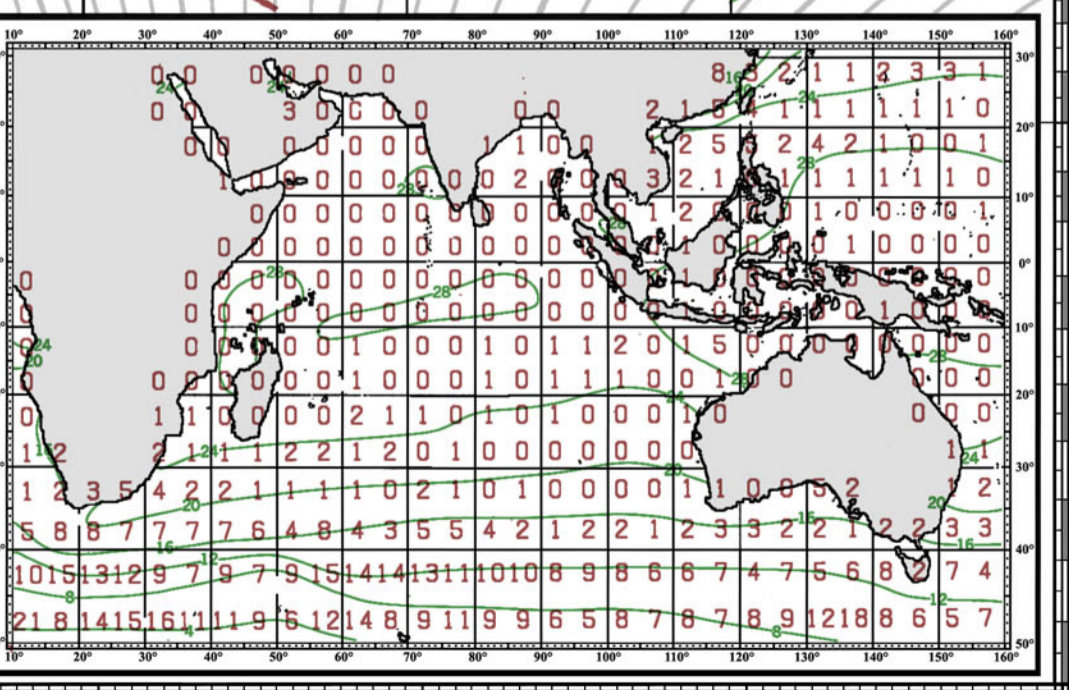
VISIBILITY
Blue lines show percentage of observations reporting visibility less than 2 miles.



SEA SURFACE TEMPERATURE
The mean sea surface temperature (°C), in green lines, is shown for every 4 degrees.

GALES—The red numerals in the center of each 5-degree square on this inset chart show the average percentage of ship reports in which winds of at least force 8 have been recorded for the month. Where "0" is given, gales may have been recorded, but too infrequently to give a percentage value.

NOTE
In all cases it must be borne in mind that ships tend to avoid areas of bad weather. For this reason, ship's observations tend to be biased toward good weather conditions—less gales and high waves being recorded than actually occurred. Hence, climatological estimates will also be biased toward the good weather conditions.



WAVE HEIGHT—The frequency pattern of wave heights of at least 12 feet has changed little since November. A large portion of South China Sea and Philippine Sea observe 12 foot waves or greater 10 percent or more of the time. Frequencies in this region increase to 30 percent in an area northeast of the Philippines. In general, south of the equator frequencies of 10 percent or more lie south of 25°S, where they increase rather uniformly to 50 percent south of 50°S. The only area in the Southern Hemisphere north of 25°S to observe frequencies of 10 percent lies between 55°E and 90°E and between 15°S and 25°S.

LOCAL WEATHER
For extended remarks on the marine climate along foreign coasts, see the appropriate Sailing Directions and Planning Guides prepared and published by the National Imagery & Mapping Agency (NIMA). For the coasts of the United States and its possessions, see the appropriate Coast Pilot prepared and published by the National Ocean Survey. The trimester publication "Mariners Weather Log" prepared and published by National Oceanic and Atmospheric Administration, Environmental Data and Information Service, carries informative articles on marine climatic conditions and tropical cyclone information on the Southern Hemisphere.

MAGNETIC VARIATION
The lines of equal magnetic variation for the Epoch 2000 are shown by gray lines on the main body of the chart. (See inset chart for the rate of annual change.)

OCEAN CURRENTS
The arrows on the chart indicate the prevailing direction, and the numerals show the mean current speed in knots. The broken arrows indicate the probable surface current flow where data are sparse, but more importantly they indicate directional variability.

EXPLANATION OF WIND ROSES
PREVAILING WINDS AND CALMS—The wind rose in blue color is located in the center of each 5° square where there was sufficient data. The rose shows the distribution of the winds that have prevailed in the area over a considerable period. The wind percentages are summarized for the eight points and calm. 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 using the scale below, gives the percent of the total number of observations in which the wind has blown from that direction. The number of feathers shows that 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 to fit conveniently in the 5° square, anything over 29 percent, the shaft is broken and the percentage is indicated by numerals.

For Example—The sample wind rose should read thus: In the reported observations the wind has averaged as follows: From N. 15 percent force 4; from N.E. 43 percent, force 5; from E. 22 percent, force 4; from S.E. 6 percent, force 4; S. 3 percent, force 3; from S.W. 4 percent, force 3; calm 2 percent.

