

## CHAPTER SEVEN

### WEATHER.

**Weather.** Nothing is certain about the weather except that it is uncertain. Meteorology is a science, and I can only hope to give a brief summary of important points here.

**Wind.** Wind, like water, moves. It can move rapidly or slowly, horizontally or vertically. Wind is air in motion trying to equalise areas of varying pressure. Such variations in pressure are most often caused by differences of temperature. When air moves from one point to another it seldom does so in a straight line. The rotation of the earth causes it to curve. In the Northern hemisphere the wind circulates clockwise around an area of high pressure (anti-cyclone) and anti-clockwise round the area of low pressure (depression or cyclone)

Changes of weather are caused by air masses having a certain temperature and humidity. It is these movements of air masses which meteorologists watch, and upon which they base most of their forecast. Air is called Polar if it comes from near Polar regions, and Tropical if it comes from near Tropical regions. If it comes from a big land mass it is called Continental, and if it comes from off the sea it is called Maritime. Polar air is cold, tropical is warm, Continental is dry, Maritime is wet. When two air masses meet the warmer tends to ride over the colder. This meeting and over-lapping is called a 'front' and often causes depressions.



CUMULUS



CIRRUS

## THE BEAUFORT SCALE OF WIND

Beaufort wind force	Mean wind speed in knots	Descriptive terms	Sea Criterion	Probable height of waves in ft.
0	0	Calm	Sea like a mirror	—
1	2	Light air	Ripples with the appearance of scales are formed, but without foam crests.	—
2	5	Light Breeze	Small wavelets, still short but more pronounced; crests have a glassy look, but do not break.	½
3	9	Gentle Breeze	Large wavelets. Crests begin to break. Foam of glassy appearance with scattered white horses.	2
4	13	Moderate Breeze	Small waves, becoming longer, fairly frequent white horses.	3½
5	18	Fresh Breeze	Moderate waves of longer form; many white horses - chance of some spray.	6
6	24	Strong Breeze	Large waves begin to form; foam crests more extensive - probably some spray.	9½
7	30	Moderate Gale	Sea heaps up - white foam from breaking waves blown along in the direction of wind - some spindrift.	13½
8	37	Fresh Gale	Moderately high waves of greater length; edges of crests break into spindrift. Foam blown in well marked streaks along the direction of wind.	18

Beaufort Wind force	Mean wind speed in knots	Descriptive terms	Sea Criterion	Probable height of waves in ft.
9	44	Strong Gale	High waves, dense streaks of foam. Sea begins to roll. Spray may affect visibility.	23
10	52	Whole Gale	Very high waves with long overhanging crests. Resulting foam blown in dense white streaks along direction of wind. Surface of sea takes on a white appearance. Rolling sea becomes heavy and shocklike. Visibility affected.	29
11	60	Storm	Exceptionally high waves. Sea completely covered with long white patches of foam lying along direction of wind. Everywhere edges of wave crests are blown into froth. Visibility affected.	37
12	68	Hurricane	Air filled with foam and spray. Sea completely white with driving spray. Visibility seriously affected.	

N.B. Sea conditions here refer to the open sea, not necessarily the Solent area.

## CLOUDS

Clouds are very important aids to forecasting.

**Cirrus.** White feathery clouds very high may give the first signs of change. If they increase and slowly cover the sky, look out for a change.

- Cirro-Stratus. Cirro-Stratus is a thin layer of high cloud covering the sky. If it follows cirrus and causes a halo round the sun or moon it may mean bad weather is on the way.
- Cirro-Cumulus. Is a mackerel sky - regular masses of cirrus clouds. If decreasing then fine weather, if increasing then bad.
- Strato-Cumulus. These are much longer than Cirro-Cumulus. Rolls of heavy cloud, rather dark. It foretells wind.
- Cumulus. Are big white 'cotton-wool' clouds. They are usually associated with fine weather, though often mean wind.
- Nimbus. A black thunder cloud rising into white cumulus, often at a great height. Indicates heavy squalls with rain or snow, thunder and lightening.
- Cumulo-Nimbus. Black thunder cloud, often very low and even right down on the sea. Means rain or snow, and usually strong winds as well.

Usually soft round clouds mean fine dry weather with some wind. Harsh or jagged clouds mean strong wind. Black clouds mean rain. High clouds moving in a different direction from lower ones, or from the surface winds indicate a change in the direction of the wind.

#### High & Low Pressure Zones.

**HIGH PRESSURE ZONE** is known as an **ANTI-CYCLONE** and is a system of air which in our Northern latitudes, spirals in a clockwise direction around an area of high barometric pressure. This weather pattern means fair, settled conditions, for the prevailing air is usually dry, as most of the moisture in the system is attracted towards the central area of high pressure. Winds around the high pressure areas are generally light to moderate, but they do increase slightly outwards towards the perimeter high pressure zones. The system is normally a stable one often lasting for some days, eventually moving on slowly towards the east with the prevailing movement of the weather pattern, the wind veering to blow from the south-east to south-west.

**LOW PRESSURE ZONE** is known as a **DEPRESSION**. This is caused by an anti-clockwise spiralling of air about a low barometric pressure centre. With it are associated high winds, often with showers of heavy rain. The winds are more violent near the system's centre, where the barometer gradient is steepest (where the isobars are packed closely together) and they grow less intense towards the circular motion's perimeter (the reverse of anti-cyclone). The onset

of a depression is often heralded first by some mare's tails - wispy cirrus cloud - high in the sky - followed later by a sheet of cirro-stratus. As pressure falls the clouds become more dense while the temperature rises and the wind backs (veers-wind shifts in clockwise direction, backs - wind shifts anti-clockwise). The sky darkens, the wind increases in strength, rain falls first lightly then finally as a downpour. Fortunately depressions do not normally remain long in one area as do anti-cyclones. They move along at a rate of 20 to 30 m.p.h. and the barometer ceases to fall as the centre of the depression passes over. Depressions do in fact have a disturbing habit of 'ganging-up' so that one follows hard upon another with short spells of fine weather between them. It is the direction of the wind which indicates the events to follow. Primary depressions always pass across the northern part of the U.K. moving north eastwards between Scotland and Iceland. Very strong winds will arrive just after the system's centre has moved away and the barometer will rise. The sky clears, there will be a few squally showers, and the wind will blow from the north-west. If the wind remains from this quarter or veers slightly, the weather should remain fine. If instead the wind backs then it is fairly certain that there will be another depression following.

#### The British Isles.

The main reason for the very unstable weather of the British Isles is the land masses which surround them and the consequent movement and meeting of different air masses. The prevailing wind is from West to East so the main movement of the weather is from West to East. There are times when the wind blows from other directions with the weather moving in from that direction accordingly.

#### Barometer.

There are two types, the ANEROID and the MERCURIAL. Both tell the atmospheric pressure and the observation of the pressure falling or rising is important when weather forecasting. The barometer is not a sure guide by itself. A rising barometer does not necessarily mean fine weather coming, nor a falling glass, bad weather. A sharp rise or fall almost always means wind. A very low reading almost certainly foretells bad weather. The average winter reading is 29.9 inches of mercury or 1010 millibars and the average summer reading is 30 inches or 1013 millibars. Intense lows may fall as low as 940 millibars while highs may reach 1040 millibars.

## Forecasting Weather.

Again I say it is a science and you really ought to research this subject before embarking on any extended sea trips.

The essential factors are the following in their relationship to one another :-

1. The direction and force of wind.
2. The atmospheric pressure and temperature.
3. The formation and movement of cloud.

Meteorological Office Weather Forecasts are given by the B.B.C. on radio and television. The radio gives special shipping forecasts and Coastal area forecasts. The G.P.O. also gives forecasts, and enquirers by telephone should ask for FORECAST OFFICE.



### B.B.C. Broadcasts.

B.B.C. RADIO WEATHER FORECASTS: Radio 1:247m. (1214kHz)  
Radio 2:1500m. (200kHz); Radio 3:464m. (647 kHz); Radio 4:  
330m. (908kHz); VHF Wrotham: 89.1MHz. Dover: 90.0 MHz.

Time	Days	Radio	Time	Days	Radio
0001	Sat. only	(SC) 4	0945	Mon.-Fri.	2
0030	Every day	(S) 2	1155	Sun. only	(S) 2
0200	Every day	1 & 2	1215	Mon.-Fri.	2
0500	Mon.-Sat.	1 & 2	1255	Every day	4
0530	Mon.-Sat.	1 & 2	1255	Mon.-Sat	4 (VHF)
0600	Mon.-Sat.	1 & 2	1300	Mon.-Fri	3
0630	Every day	(S) 1 & 2	1355	Mon.-Sat	(S) 2
0630	Mon.-Sat	1 & 2 (VHF)	1730	Mon.-Fri	2
0650	Mon.-Sat	4 (VHF)	1750	Mon.-Fri	4 (VHF)
0655	Mon.-Sat	4	1755	Every day	2
0700	Mon.-Fri	3	1755	Every day	4
0700	Sat. & Sun.	1 & 2	1755	Sat. only	4 (VHF)
0700	Mon.-Fri	2	1800	Sat. only	2
0730	Mon.-Sat	1 & 2	1805	Mon.-Fri	3
0750	Mon.-Sat	4 (VHF)	1815	Mon.-Fri	2
0755	Ev.day ex.Sat.	4	1830	Mon.-Fri	1 & 2
0800	Mon.-Fri	2	2158	Sat. & Sun.	4
0800	Sat. & Sun	1 & 2	2159	Mon.-Fri	4
0800	Every day	3	2330	Sun.only	3
0830	Sat. & Sun	1 & 2	2340	Fri. only	4
0855	Sun. only	4	2345	Sat. & Sun	(SC) 4
0900	Mon.-Fri	2	2351	Mon.-Fri	(SC) 4
0900	Every day	3	2355	Mon.-Sat	3
0930	Sun. only	1 & 2			

S = Shipping Forecasts 1500m. (200kHz). SC = Coastal Waters.  
All others are LAND FORECASTS.

GALE WARNINGS are broadcast on Radio 2 (1500m) at first programme juncture after receipt. For special Weather Forecasts for those about to sail, present weather conditions and details of all weather broadcasts, warnings and telephone numbers see Reed's Almanac, p.824.

SEE DIAGRAM - Shipping Forecast Areas.

### Gale Warnings.

Gale warnings are issued only when winds of at least Force 8 or gusts reaching 43 kn are expected.

Severe gale implies wind of at least Force 9 (52 kn). The meaning of the following terms :

Imminent	-	Within 6 hrs.
Soon	-	between 6 and 12 hrs (from time of issue)
Later	-	more than 12 hrs.

Visual gale warnings along coast of U.K. take form of cones three foot high and three feet wide of base. Point uppermost means a northerly gale, point down means southerly gale.

## THE WEATHER - A GLOSSARY

A DEPRESSION	an area of low barometric pressure, anti-clockwise wind in N. Hemisphere.
ANTICYCLONE	an area of high barometric pressure clockwise wind in N. Hemisphere.
ATMOSPHERIC PRESSURE	is the force exerted by the atmosphere at the earth's surface. Normal = 760 m.m. Hg (millimetres mercury)  Decrease .75 m.m. Hg for every 28ft of ascent.
BAROMETER	Mercurial of Aneroid. See text.
ISOBARS	lines of equal pressure drawn on a weather map showing horizontal distribution of pressure.  They are drawn at intervals of 4 millibars.
WIND	Is the horizontal movement of the air over the earth's surface when there is a difference in atmospheric pressure between two areas.
Wind Strength	depends on the pressure gradient which is related to the distance between the isobars.
Wind Direction	does not blow directly from an area of high pressure to one of low pressure but is at an angle to the isobars being directed across the isobars towards the low pressure.  In Northern hemisphere wind circulates ANTI-CLOCKWISE around a low pressure area and in a CLOCKWISE direction around a high pressure area.



Angle of Indraft

is the angle which the wind makes with the isobars.

Veer

A clockwise shift in wind direction.

Back

An anti-clockwise shift in wind direction.

Summary of useful situations - the wind strengthens and veers by day, back and lull by night.

Gusts

changes in wind speed lasting few seconds.

Squalls

changes in wind speed lasting some minutes.

TEMPERATURES

Sun source of heat.

Temperature varies with latitude, height, season, prevailing wind, amount of cloud, nature of the surface.

#### DAY TIME

Land

sun's heat retained by upper layer of earth causing considerable rise in temperature of surface air which expands, and with cooler air lying above the surface, rises. This results in fairly high temperature being experienced over the land.

Sea

heat received from sun is absorbed to a considerable depth because more heat is required to raise the temperature of the sea, relatively low temperatures are experienced over the sea.

#### NIGHT TIME

Land

rapidly loses its heat and low temperatures prevail.

Sea

gradually loses its heat because the heat is being drawn up gradually from well below the surface, results in only small variation between day and night temperatures.

Lapse Rate

is the rate at which temperature decreases with height. This plays an important part in the formation of cloud, rain etc.

An average rate of decrease in temperature is  $2^{\circ}\text{C}$  ( $3.5^{\circ}\text{F}$ ) per 1,000 ft.

WATER VAPOUR

Presence of water vapour in the atmosphere may give rise to formation of cloud, rain etc. Is increased by evaporation from seas, lakes etc. Is decreased by condensation in form of cloud, rain, fog.

The maximum amount of water vapour that can be present at any one time depends on air temperature.

Air containing maximum amount of water vapour appropriate to its temperature is said to be saturated.

AIR MASS

a large mass of air covering an extensive area, and having very little horizontal variation in any of its characteristics, particularly temperature.

Frontal Zones

are the boundaries between two different air masses.

A Front

is a line where the frontal zone intersects the surface of the ground.

Source Regions

The Poles and sub-tropical pressure areas where air is caused to be fairly slowly yet effectively made cold and hot respectively. This is done by the air being in contact for fairly long periods with the earth's surface at these regions.

Cold Air Mass

Main source is the Polar or Arctic region.

At its source it is characterized by

1. low temperature
2. low moisture content
3. small change of temperature with height.

The tracks of all cold air masses are towards warmer regions and the air in the lowest layers becomes warmed.

The results of this heating are:

1. the lapse rate increases in the lowest layers. Strong ascending current of air develop (convection currents)
2. The moisture content of the air increases as the tracks lie over a warm ocean. The air temperature rises and thus its capacity to absorb moisture increases.

Warm Air Mass

Initially divided into two types: Maritime and Continental.

Tropical Maritime  
Air Masses

Main source region is the sub tropical oceanic anti-cyclonic area (i.e. High pressure area of N. Atlantic in vicinity of the AZORES)

At source are characterised by

1. High Temperature
2. High Moisture content
3. Slight lapse rate.

The tracks of these air masses are towards higher latitude therefore the lowest layers become cooled as result of being in contact with cooler sea or land.

The result is:

1. The lapse rate decreasing still further
2. reduced capacity of lowest layers to absorb moisture.

Tropical Continental  
Air Masses

Main source region - NORTH AFRICA.  
Are characterised by:

1. Very high temperature in lowest layers especially.
2. Low moisture content - air is dry.

The track of these air masses is towards higher latitudes as they move northwards they become cooled in their lowest layers. The moisture content remains low unless they flow over sea when after a period they change to maritime types.

Orographic Uplift

Is the uplift of air as it is forced to ascend on reaching the coast or high land - it accelerates cloud formation.

Troughs of Low Pressure

These are indicated by isobars extending outwards from a region of low pressure having the lower pressure along the line of the trough. The isobars frequently change sharply in direction at the trough forming a 'V' shape.

A Line Squall

When a cold front is well defined the sudden under-cutting of the air by the advancing colder air may give rise to cumulo nimbus cloud, heavy rain, thunder storms and squally weather.

A Col

Is an area of small and variable pressure gradients lying between two high and two low pressure areas which are diametrically opposite each other.

**WIND ORIENTATION  
RULES (FOR  
NORTHERN  
HEMISPHERE)**

- a. Stand with your back to the lower wind and if high clouds advance from the left then the weather should deteriorate.
- b. Similarly if high clouds advance from the right then the weather should improve.
- c. If lower and upper clouds are moving on parallel courses, then the weather will probably remain much the same.

Notes

The lower wind must be truly due to the circulation about Lows and Highs and not local ones due to sea or land breezes etc.

The best indication of lower wind direction is the motion of low clouds.