

corresponding high pressure region being called a "high."

The cyclone is not the commonest type of "low" which affects New Zealand. More frequently the "low" is shaped like an inverted "V" with the isobars wider to the southwards. Such depressions are wedged in from the south between adjacent anti-cyclones. Should the isobars take on the form of a wide inverted "V" so that they are almost straight lines, they produce the westerly type of weather.

There are several other forms or groups of isobars which appear on our weather charts, some of the more important types of which may be mentioned. In the rear of a cyclone there will sometimes develop a smaller depression which is termed a "secondary." It may be a further centre or merely a loop or sinuosity in one or more of the isobars. Though usually short-lived the rain is often heavy in a secondary and atmospheric conditions are often very disturbed. Hail, thunder, snow or a cold snap may be experienced.

Then we have wedge-shaped isobars, a projecting area of high-pressure wedged between two "lows." The wedge most frequently points to the south. It is a fair-weather type of pressure distribution but the fine weather is usually of brief duration because of the "low" which follows. It is a case when the saying: "It cleared too quickly to last" might be applied.

Another system is the Col, which is a ridge of relatively high pressures lying between two adjacent depressions and joining two anti-cyclones. Here we get variable winds or calms with usually fine and sometimes brilliant weather, but occasionally dull, gloomy conditions possibly with thunderstorms.

Lastly we may mention straight isobars. They are called straight from the fact that they have no curvature over a large area. Usually the low-pressure isobars are on the polar side with high pressure to the northwards, so that the winds are from some westerly direction in conformity with the isobaric trend. With this type there is associated great diversity of weather with somewhat unsettled conditions where the pressure is low and fair or fine weather where it is high.

The Influence of Winds.

UPON inspecting the different types of weather charts certain facts will be noted with regard to winds. The latter will be observed to blow with fairly marked uniformity of direction and velocity. They will nearly always blow along the isobars, and if you stand with your back to the wind, barometers will be lower on your right hand than on your left. The wind does not assume a direction strictly parallel with the isobars but is inclined at an angle across the isobar from high towards low pressure.

Thus we have the wind rotating round the centre of a cyclone in a similar direction to the hands of a watch but spirally inwards so that with the cyclone moving in an easterly direction, in front of the centre the winds are northerly, and, in the rear, southerly; directly north of the centre they are westerly, while to the south, easterlies prevail.

On the other hand, the winds in an anti-cyclone move round the centre in a direction contrary to the hands of a watch, and at the same time spirally

outwards, the front of the centre having southerly and the rear northerly winds.

Next we must consider the force of the wind, which is related to the rate at which the pressure changes as you move from high towards low pressure. If we draw a line joining two adjacent isobars and at right angles to them, the measure of this line is called a "gradient." The shorter this distance

It is equally possible for gales and heavy rain to occur in the southern V-shaped depressions, although as a rule, the two types produce the most severe effects in different parts of the Dominion. Our severest southerly and south-easterly weather usually occurs in the rear of cyclones, whereas in V-shaped depressions, winds are usually from some westerly direction, and it is districts with a

country in the prevailing winds, and where they reach the ground, are usually destructive. In New Zealand, they are rare, and usually small, and of no great violence. The removal of a roof or two, the shifting of small sheds, or the uprooting of trees is usually the extent of the damage they cause.

The weather in a depression, or an anti-cyclone differs materially according to the situation of their centres. It will be generally noted, however, that unsettled conditions, with strong winds and rain, are associated with "lows," while quiet and fair, to fine weather is experienced with anti-cyclones or "highs."

Summing up the Data.

IT is the business of the meteorologist to find out in what direction the depressions and anti-cyclones within the area covered by his map, are going to move, and how they are going to change, and accordingly to anticipate the changes of wind and weather incidental to their movements.

If a series of synoptic charts are examined together, it will be discovered that the areas of high and low pressure follow one another in succession from west to east at intervals, and it is this important fact which enables us to give notice of changes likely to take place.

Having briefly considered some of the main weather controls and the principles on which forecasts are based, we may now examine some of the actual charts themselves. It is difficult without resource to such examples to explain pressure systems, their movements and the wind and weather associated with them. Following, therefore, are given some small-scale reproductions of isobaric charts prepared and used by the Meteorological Office in issuing weather forecasts.

In Figure 1, which shows the chart for Monday, August 6, 1928, there are two anticyclones. One having recently crossed the northern Tasman Sea is now centred north-east of East Cape, while the other, an extensive one, stretches from the South Island over the Tasman Sea and the whole of Australia. The anticyclone exhibits the eastward advance characteristic of pressure systems and, barometers are rising over the greater part of New Zealand but in the extreme north a slight fall is taking place on account of a cyclone north of Norfolk Island, pushing its way in a south-east direction. From the South Island extending eastward to the Chatham Islands there is a moderate depression of the westerly or southern type. The latter crossed the South Island during the previous day and caused moderate

WEATHER REPORT: THURSDAY, AUGUST 16, 1928.

Station.	Barometer.	Temp. deg. F.	Direction.	Wind Force.	Weather.	Sea.	Notes.
Norfolk Island	30.04	—	S.W.	6	bc		
Awanui	29.66	58	S.W.	6	bc		
Auckland	29.49	55	W.	6	c		Heavy rain in night
East Cape	29.28	54	W.N.W.	3	c	Mod.	Rain 114pts.
Cape Egmont	29.59	48	S.W.	2	r	Mod.	Mod. rain in night.
Napier	29.27	53	S.	2	b	Mod.	Heavy rain in night.
Farewell Spit	29.43	50	W.	3	c	Mod.	Rain, 11 pts.
Stephen Island	29.43	53	S.	7	c	Rough	Rain, 112pts.
Wellington	29.44	44	S.S.W.	9	o		Rain, 23pts.
Cape Campbell	Interrupted.						
Greymouth	29.58	47	E.	3	o	Mod.	
Akaroa Lighthouse	29.67	44	S.W.	8	ofr	Heavy	Heavy rain in night.
Nugget Point	29.89	39	E.	2	o	Mod.	Light rain in night.
Puyssegur Point	29.89	42	S.E.	5	bc	Mod.	
Chatham Island	29.31	49	E.S.E.	2	o	Smooth	
Sydney	30.00	—	W.	1	f		
Hobart	29.60	—					
U.S.S. Maunganui:							
Lat. 37 S.							
Long. 178 W.	29.28	—	N.W.	7	c	Rough	
U.S.S. Niagara:							
Lat. 34 S.							
Long. 166 E.	29.88	—	S.W.	5	bc	Rough	Heavy W.S.W. swell
U.S.S. Kaiwarra:							
Lat. 43 S.							
Long. 161 E.	30.00	—	S.W.	4	od	Mod.	Mod. southerly swell.

Beaufort Scale of Wind Force with Equivalent Velocities at 16ft. above Ground.—0 Calm, 0-1 m.p.h.; 1 Light air, 2-3; 2 Slight breeze, 4-7; 3 Gentle breeze, 8-11; 4 Moderate breeze, 12-16; 5 Fresh breeze, 17-21; 6 Strong breeze, 22-27; 7 High wind, 28-33; 8 Gale, 34-40; 9 Strong gale, 41-48; 10 Whole gale, 49-56; 11 Storm, 57-65; 12 Hurricane. Weather.—(b) Blue sky, cloud amount 0-3 tenths; (bc) Blue sky and detached clouds, cloud amount 4-6 tenths;

(c) Cloudy, cloud amount 7-8 tenths; (o) Overcast, cloud amount 9-10 tenths; (g) Gloomy, dull; (u) Ugly, threatening; (r) Continuous or steady rain; (s) Snow; (d) Drizzle; (p) Passing showers; (h) Hail; (q) Squally; (l) Lightning; (t) Thunder; (f) Fog; (m) Mist; (z) Haze. State of Sea and Swell.—0 No swell, 1 Mod. swell, 2 Heavy swell, calm or slight sea; 3 No swell, 4 Mod. swell, 5 Heavy swell, Mod. sea; 6 Rather rough sea; 7 Rough sea; 8 Very rough sea; 9 Mountainous sea.

is the greater or steeper is the gradient, just in the same way that the bunching of contours on an ordinary map denotes steepness of hills. The strength of the wind, then, depends on the distance between the isobars, the force increasing as the isobars lie closer together.

Usually the isobars in a cyclone are closer together than in an anti-cyclone, and this accounts for the stronger winds experienced with the former system.

Cyclones and Anti-Cyclones.

SOME people apparently are apprehensive at the mere mention of the term "cyclone." It should, however, be understood that the term applies to the particular type of pressure system in which we have isobars enclosing a low-pressure centre, and that not only do cyclones vary greatly in intensity but their characteristics are different in different latitudes. In the tropics they are usually small and intense, and the heavy rain, hurricanes, and sometimes tidal waves they produce do great damage over small areas; but by the time such a cyclone has moved to temperate latitudes it has extended and covers a much wider area, and the isobars are not so close together, and though there may be gales and heavy rain in parts of the cyclone they are seldom violent or destructive.

westerly aspect that suffer most. It is for such reasons that it is necessary to distinguish between cyclones and other forms of depression. It is to be remembered, however, that it is just one of our storm types, and need usually be no cause for apprehension. usually be no cause for apprehension. Not only is there confusion between the temperate and the tropical types of cyclone, but the tornado is often called by the newspapers a "cyclone." Tornadoes are atmospheric whirls of a diameter varying from a few yards to a quarter of a mile, and, in America, even more. They are usually associated with wind-shift lines, or violent thunderstorms. They move across the



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