

FIG. 1



FIG 2



ISOBARS AND WINDS

FIG 4



Approximate path of the centres of the anticyclones in each season



FIG 5

anticyclones of the high pressure belt produces the following winds :—

(1) *Westerly winds*—our “prevailing westerlies”—blow along the southern fringe. These winds bring rain to the west coast of New Zealand, but are generally warm and dry on the eastern side of the mountains, owing to the water-vapour content being decreased and the air being warmed by the descent to the plains.

(2) *South-east winds*—i.e., the south-east trades—blow along the northern edge. These winds affect New Zealand very little.

(3) *Northerly winds* blow behind each anticyclone—i.e., on the western side of the high pressure. These winds are a *warm air mass*; whether they have a high humidity depends on whether the air has been blowing for a considerable period across warm seas. When a warm air mass with a high water-vapour content is cooled, condensation readily occurs, resulting in mist, fog, or drizzle, or low cloud on the windward side of mountains. On the leeward side there are generally blue skies and warm sunshine.

A week of northerly winds means that there is an extensive anticyclone to the east of New Zealand. The wind tends to become progressively warmer and damper.

(4) *Southerly winds* blow ahead of each anticyclone—i.e., on the eastern side. When a mass of cold air from the Antarctic Ocean is moving northward to temperate latitudes the lower layers are

warmed by contact with the ground. Thus the lower layers become considerably warmer than the upper layers of the atmosphere and convection currents are set up. The rising air expands and cools; towering cumulus clouds form; often there are heavy showers and sometimes hail.

*Local Winds.*—(a) Easterly winds bring a fair amount of rain to east coast districts. These winds are usually connected with cyclones moving across the north of New Zealand. For example, if a cyclonic storm passed to the north of New Zealand, the easterly wind along the southern fringe might blow across the east coast (see Fig. 5). In summer, tropical cyclones sometimes move down off the Queensland coast and pass close to, or across, New Zealand, causing specially strong easterly or north-easterly winds in eastern districts of the North Island. Where the winds cross hills, as in Hawke's Bay, floods sometimes occur as a result of the high rainfall.

(b) The Canterbury nor'-wester is a wind of the Föhn type.

(c) Mountain and valley winds are common in hilly districts—e.g., the Barber—a cold wind which blows down the Grey River valley in Westland.

(d) Land and sea breezes occur in coastal districts in anticyclonic weather when there is no strong general wind to mask their effects.

## The Effect of Depressions

You will see in Fig. 6 that a front, known as the *meridional front*, extends