

FIG 10



FIG 11



FIG 12



FIG 13



layers of the air become warmer, but gradually the proportion of blue sky increases and the wind moderates, and if we are lucky an anticyclone becomes established.

The above section describes the typical results when the centre of a conventional, well-behaved depression passes across New Zealand. However, as we know, such regularity in New Zealand weather is the exception rather than the rule. Here are some other types of weather common in New Zealand:—

(a) *An Occlusion.*—The cold air along the cold front pushes under the warm air of the warm sector, wedging it up. As the cold front thus pushes forward it "catches up" the warm front, wedging the intervening warm air off the ground. Thus a portion of the front becomes "occluded." The occluded portion extends until all the air in the warm sector has been wedged off the ground. The depression continues as a weak, dying whirl of cold air and finally disappears. (See Fig. 12.)

(b) *Secondary Cold Fronts.*—Sometimes another cold front develops behind the first, and perhaps others behind that. The wind becomes variable just before the arrival of the secondary front; lowering cloud and showers accompany the change to a squally southerly. This is believed to be because the southerly arrives not continuously, but in surges, and these extra surges are the secondary cold fronts. (See Fig. 13.)

(c) *A series of Antarctic, or Westerly Depressions,* the centres of which pass to the south of New Zealand. These naturally have most effect in spring, when the track of the anticyclones is farthest north. (See Fig. 3.)

When the northern part of an Antarctic depression crosses New Zealand—i.e., a Λ -shaped depression—we have a cold front only. A northerly or north-

westerly wind backs to the south-west or south, and there may be a period of showers or rain as the change occurs. Often successive depressions of a series pass with great rapidity. The southerly veers gradually back to north-west on the approach of the next depression; then comes another southerly change. It is during the passage of one of these depressions that our weather maps show one of the most characteristic "isobar patterns," a Λ -shaped depression between two anticyclones. (See Fig. 6.)

Types of Rain in New Zealand

(1) *Cyclonic rain,* due to the passing of warm and cold fronts.

(2) *Orographical rain,* due to topographical features. This includes not only mountain rain, but any rain caused by physical features. It is believed that a fair proportion of Wellington's cloudy days (often with light drizzle or rain) are caused by air flowing into the narrow channel of Cook Strait. Just as the tide rises in a narrow estuary, so air rises in the narrow channel of the strait. The rising air expands and cools, causing mist and drizzle.

(3) *Convictional rain,* occurring:—

(a) After a southerly, when the cold air in contact with the warm ground is heated in its lower layers until it is much warmer than at higher levels; and

(b) On very hot days in inland districts, when the ground, and consequently the air in contact with it, becomes very warm.

In concluding these notes I would like to thank the Meteorological Department for their helpfulness in furnishing information about the most recent research.

